CHAPTER- 1

INTRODUCTION

1.1 Introductions:

Computers play a vital part in increasing and pertaining knowledge domain, and that they can even ease the training of science. Model code may present prospects to investigate thoughts and models that don't seem to be without delay accessible within the laboratory. For instance, it's arduous for researchers to conduct experiments requiring pricey materials, unavailable instrumentation and dangerous procedures. Moreover, the researchers don't have most time to remain at general laboratories. Model will offer researchers with accommodative atmosphere that alter researchers to find out what they have.

Physical Experiments are becoming increasingly very multifaceted and rising demands are made for their intellectual procedure in demanding surroundings. As a result the organizations for Physical Experiments have developed proponent in intricacy from untimely numerically regulated machines to completely self-governing Physical Experiments. As the control framework intricacy expanded developers began searching for devices that might support in the research plan process. One such approach is virtual prototyping, which empowers designers to quickly assess new plans utilizing machine based recreations without needing go between physical models. To date, no simulation framework has had the ability to superbly duplicate the elements of this present hardware’s. In practice numerous test systems make streamlining suspicions of certifiable physical science to simplicity the usage trouble and enhance the computational effectiveness. The errors between the virtual simulation and this present reality can cause software frameworks advanced in a test system to perform defectively in this present reality. Many researchers voiced his doubt in regards to the exchange of physical systems from reproductions to true Physics Experiments. In scientific education, the laboratory courses perform very crucial job. The automation method transform environment of traditional laboratories, there is lots of discussion on the traditional verses simulation laboratory. (Ma, J., and Nickerson, J. V., 2006):"There is a true risk that projects; which work well on
recreated Physics Experiments will totally fizzle on genuine Physics Experiments as a result of the contrasts in true sensing and incitation it is exceptionally difficult to mimic the real flow of the genuine world"

This is a notion imparted by various analysts and is generally recognized in the simulation field (Arpaia, P. et. al., 2000). Nonetheless, a good developer and physics scholar can utilize their past experience to distinguish undesirable and improbable comes about because of a reproduction apparatus and adjust their workflow or controller plan as needs be.

Indeed, with extra instruments the unpredictability of Physics Experiments outline is, no doubt ruined by the limit of scholars to comprehend the effect of all conceivable configuration variables. Accordingly a developing grouping of specialists expected to make mechanized configuration techniques dependent upon the same underlying reproduction innovation utilized as a part of virtual prototyping devices. (Holden, M. K., 2005).

Mechanized outline techniques create actual experiments plans by investigating potential outlines dependent upon estimations a product of immediate configuration assessments. Automated outline designs don't have previous wellspring of past experience to guide them, so the methodology gains experience from many applicant simulation trials to create logically enhanced outlines. Consequently, it must augment the unwavering quality of the data picked up from every configuration assessment; any other way it could accelerate defective design plans.

The key concern for a mechanized outline procedure is the means by which the parameters may as well best be assessed. In the event that they are assessed utilizing true Physics Experiments within this present reality, then Physics Experiments must be built and assessed progressively. This might take a breather for any mechanized outline methodology to produce a simulation plan, and all the benefits picked up from virtual prototyping methodologies might be lost. (Chaturvedi, S., 2003)

An elective assessment technique is to utilize a test system which can assess the plans speedier than constant, without needing Physical Experiments development. On the other hand, in assessing its outlines it might reach rely on upon qualities of the reenactment that don't match the conduct of this present reality. Without an elective
intends to confirm the configuration, it might be unable to distinguish and right poor plans that will in all likelihood fizzle in this present analysis (Edleson, et. al., 1999).

One approach to purpose this is to develop simulation framework and java development approaches for web tool configuration (Harms, U., 2000). By approving the simulation’s comes about on genuine equipment the contrasts between the virtual and true experiments might be dispensed with. On the other hand, the dependence on the physical Experiment's findings makes it challenging to outline actual Physics Experiments for dynamic situations (e.g. sprays, fluids), and makes Physical Experiments structural outline less lengthy and expensive. This points of confinement the convenience of these methodologies for fast virtual prototyping.

As an elective, Pelinck, M. J., (2005) proposed "Minimal Simulation", an immediate outline methodology built absolutely with respect to constrained virtual development. This approach kept tabs on precisely simulating just a couple of key parameter basic to the target conduct of the Physics Experiments. In spite of the fact that this strategy has reported various milestones, it requires an architect to select the key simulation issues and develop a custom physics test system. Besides, the physics test system is just equipped for producing one conduct for the Physics Experiments and can't be summed up. Once more, this makes the immediate advancement of virtual frameworks for complex Physics Experiments in complex situations.

Assessment and examination applied to edification take part in an imperative part in teaching and learning procedures. They will divulge data not solely regarding researchers’ learning results though the associated problem-solving skills. Also, researchers’ learning results will indicate their levels of skills. Therefore, academics will modify their teaching content supported researchers’ learning results.

Automatons have become progressively more complicated and increasing demands are created for their intelligent operation in difficult environments. Consequently the management systems for automatons have full-grown exponentially in quality from early numerically controlled machines to completely autonomous automatons. As the system quality augmented engineers started searching for apparatus that will aid within the controller style technique.
One such apparatus is practical prototyping, that sanctions engineers to promptly evaluate novel styles using computer based typically replications without needing negotiator physical prototypes. To date, no replication has been able to completely replicate the dynamics of the important world. In examining numerous simulators create simplifying assumptions of world physics so as to ease the implementation problem and improve the process potency.

The discrepancies between the virtual world and therefore the planet will cause management systems developed in a very machine to execute inadequately within the world.

This is a reaction shared by variety of researchers and is broadly recognized within the replication field. Conversely, engineer will use their previous expertise to acknowledge undesirable and delusive results from a replication tool and amend their advancement or controller style accordingly.

Even with further tools the complexity of physics research project is being delayed by the ability of engineers to take hold of the influence of all latent style variables. As a result a growing body of researchers aimed to form machine-controlled style processes supported identical underlying replication technology employed in practical prototyping tools.

Automated software processes generate simulation styles by exploring potential styles supported measurements made of direct style evaluations. Machine-controlled style processes don't have an external supply of previous expertise to guide them, therefore the method learns from thousands of candidate experiment trials to get more and more improved outcome. Thus, it should maximize the dependability of the knowledge gained from every experimentation evaluation; otherwise it may lead to faulty styles.

The very apprehension for an automatic style method is however the software controllers ought to best be evaluated. If they're evaluated using real automatons within the universe, then physical automatons should be created and evaluated in real time. This is able to take a prohibitively long term for any machine-controlled software method to get a software controller, and every one the advantages gained from virtual prototyping methods would be lost.
A substitute analysis technique is to use a machine which might judge the software interface quicker than real time, while not requiring physical golem construction. However, in evaluating its performance it should come back to rely upon characteristics of the replication that don't match the behavior of the important world. Without an alternate suggests that to verify the planning, it'd be unable to acknowledge and proper poor styles which will presumably fail within the universe.

One method to resolve this can be to fuse replication and hardware methods for controlled software system. By corroboratory the replication’s results on real hardware the variations between the virtual and real worlds may be eliminated. However, the reliance on the physical The photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments hardware makes it tough to model automatons for any environments (e.g. temperature specific), and makes automaton structural modular changes. This limits the utility of those methods for fast virtual prototyping.

Also an automatic modeling method will be based mostly on restricted replications like temperature control system. We will target on accurately simulating a couple of key aspects important to the target behavior of the photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments automaton. Though this methodology has reportable successes, it needs an engineer to pick the key replication options and build a custom physics experiment. Moreover, the experimental set up is just capable of generating one behavior for the automaton and may not be generalized. Again, this makes the automated development of management systems for advanced automatons in advanced environments troublesome.

For a general automatic software method to achieve software controllers for advanced automatons in The photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments environments a whole physics replication is needed. So as for the software controller to control within the limit, the physics experiment should give a mechanism for guaranteeing that solely the valid sections of the physics experiment are relied upon. This is often what this research aims to attain.
For a general immediate outline approach to succeed in improving physics parameter designs for complex experiments in dynamic situations a complete basic physics simulation is needed. In place for the physics parameters to work in this present reality, the material science test system must give a component for guaranteeing that just the legitimate segments of the test system science are depended upon. This is the thing that this postulation intends to air conditioning.

1.2 Associated Work:

There have been an extensive number of endeavors at simulating a part of the Physics Experiments outline transform, with over 100 distributions a year since 1997 talking over a part of the methodology (Bak, P., 1997). Nonetheless, generally few have kept eye on beating the transitioning of science systems from a reproduced environment to this present reality (Troitsky, S. V., 2012). Of the analysts that do worry about intersection the actuality pitfalls, just a handful manages experiments that have complex progress (Ferrero, M., and Van der Merwe, 1997).

1.2.1 Types of Computer Simulations:

Normally the process of simulation can be described by using following types.

- Equation Based Simulation
- Agent or individual based simulation
- Multiscale simulation
- Monte Carlo Simulation

Basically all the above types of simulation are widely used to forecast the output of different or particular system, to understand the concept and results of particular system and to investigate the system.
1.2.1.1 Equation-Based Simulations:

The equation based simulation implies in the case of models which are based on differential equations for example the simulation models of physics science design on the base of mathematical models. In this type of simulation model, user can use two cases one is the particle system because it can requires lots of differential equations for n–number of separate bodies which will be associated with particle based system. In second case, simulation model would be on based of field, in which many differential equations require for the calculation of time parameters and their field evaluation.

The good example of such type of system is formation of galaxy with help of simulation in which user can study the gravitational parameter of different bodies in individual way by using the transformation of the system from continuous model to separate equal parts. Another good example of such system is fluid simulation in weather-related system. In weather-related system some time form sudden change environment or atmosphere at particular state and it may causes hazardous weather-related phenomenon and it will be capable to make serious social disruption and human life loss. So for avoiding these entire things, simulation model can be used as predictor in weather-related system on the base of field information.

1.2.1.2 Agent-Based Simulations:

It is somewhat similar to particle based simulation because user can study behavior of n number of bodies but this simulation models system are described behaviour of the individual on basis of its own local rules not like differential equations based simulation. Such types of modeling are widely used in social sciences and behavioral sciences as well as in case of networked interaction type of study. The best example of such system is segregation model.
1.2.1.3 Multiscale Simulations:

In some of particular system requires hybrid model because they are not particle or field based type of system and hence they requires another and different type of scale for description and this can be possible with models of Multiscale Simulation. For example, rough description of simulation model of dynamics like model of bulk matter in which different stress and strain are acted on it as like a field. This model represent enlarge image or area of material at which effect taking place with fine grained modelling methods. In this type of modelling, there are two mechanical theories requires one is quantum mechanics and another is dynamics of molecular theory.

The multiscale method further divided into two sub types one is serial multiscale modelling and another is parallel multiscale modelling.

A) Serial Multiscale Modelling:-

- this is a more traditional method in which user can select a particular area for simulation and the result obtains after the simulation of this area describes in parameters which will be fit for higher level model intake then it will go through the process of the algorithm calculation. This method is not useful in case of different strongly joined scales.

B) Parallel multiscale Simulations:

- When considerable behaviour is form due to the strong interaction of large number of different scale and hence it requires such model which would be simultaneously simulated each and every area of system. Hence it requires modelling that is called parallel multiscale modelling. It is a starting point and ground work of the computing system as everywhere and anywhere type of advanced computer concept in which user can be used any device like laptop, tab etc. with any format and at any location. It is also called as Sub-grid modelling because it stands for sign of small scale physical process which are not effectively set on particular simulation in the form of a length scale. For example, the turbulence flows of fluids consist without clearly defined various exited length and time scales. Hence in many process and applications are basically depends upon the turbulence modelling and their results. The some
simulation like Large Eddy simulation of turbulence helps to explain up to some extent of prescribe length scale for dependency of motion of fluid on time and space factor. But these simulations are unable to measure the value of motion or velocity after the smaller than the specific velocity of fluid and these scales of elimination are called sub grid scale motion. Hence the sub grid scale modelling is useful for denote the effect of small scale fluid motions which are not possible at normal way. For the simulation of hydrodynamics turbulence at level of simulation of sub grid scale requires deep understanding of physics and statics scales and hence it is one of trend of physics still waiting for research on turbulence flow of small scale.

1.2.1.4 Monte Carlo Simulations:

From the different scientific literature study it is clear that one class of simulation is most favorite and widely used that is Monte Carlo Simulation. MC simulation is step by step process of calculation, processing of data and generation of automatic output or results on computer. It is useful in case of calculations of properties of mathematical model in which the output of model is not future of that model. A good example is the calculation of the value of $\pi$ for group of objects which will falls on square if the value of falls of group of object on circle design inside the unit square on paper is given $\pi/6$. then by considering above situation computers starts its algorithms and simulated procedure this complete phenomenon is called MC simulation.

However Lots of philosophers of science are not considering the MC simulation is a genuine method of simulation hence they went away from the MC simulation to ordinary computer languages for modeling. Grüne-Yanoff and Weirich (2010) stated that the MC simulation method is not useful for the replication modeling because it reproduces the system in the form of deterministic system's properties and hence it is not good substitute for the system.

Despite the fact that there have been various trials including the development of a Physical Experiment's morphology, or co-advancement with the simulation framework, there are just a couple of programming bundles that have been made freely accessible as a consequence of the exploration work (Serway, R. A., 2012).
Lunce Les M., (2006) described Educational simulated models which can be designed on the basis of factual system or observable fact, it can be categorized in three general types as follows:-

- Continuous models: -
  These types of simulation models are designed on the basis calculus and it characterizes an infinite number of states of the system.

- Discrete models:-
  These types of simulation models are characterized discrete states of the system.

- Logical models: -
  These types of models are worked on the set of commands which would be executed by using a high-level computer programming language.

In the available above models The Continuous and Discreet simulation models offer the application in the stream of engineering and scientific simulation and the logical models broadly helps in case of development of educational simulation. Alessi S. M. & Trollip, S.R., (2001) strongly mentioned that the educational game is designed on the simulation concept but it is not considered as educational game if the game is not build on the existent phenomenon or existent model.

Lunce Les M. (2006) suggested four categories in which all educational simulation falls, namely they are Physical Simulation, Iterative Simulation, Procedural Simulation and Situational Simulation.

- Physical Simulations: -
  It is open ended simulation and user has permission to change the variables in open ended scenario. The global weather model, offers the certain parameter for manipulation and after that student can observe the changes in results, is well known example of physical simulation.

- Iterative Simulations:-
  In this case, the design of simulation based on invention learning in which students can conduct scientific research like developing hypothesis, testing hypothesis and observing obtained results from simulation. The student can
run simulation repeatedly with changing variables, each iteration perform the function of testing a hypothesis. This type of simulation is useful for teaching when the real time system is not available for example biology facts, geology facts or economics facts.

- **Procedural Simulation:**
  This simulation are real world simulation and hence in this case student can change the variables or object up to the level of clearly understanding and acquiring a mastery skill to change in real world setting of the same object. Chemistry lab is classical example of procedural simulation in which students work as real world laboratory setting and hence they can get complete understanding of real world laboratory setting.

- **Situational Simulations:**
  Situational simulation are generally designed for student to explore their knowledge for different situation in each iteration of simulation (Wilson & Cole, 1996). These simulation use as like vehicle in which student can explore different options and decision paths. One point has to be noted in case of situational simulation that is the situational simulation is most difficult to design and utility due to the reason that it has open ended system and difficult to predict human behavior.

1.3 **Simulated Experiments Design:**

Automated/simulated outline design ordinarily utilize a development procedure to immediately produce a virtual configuration. To represent how this process functions, a case study is offered (Refer to Chapter 4,5and, 6).

Alternative development process might start with a set of arbitrarily produced outline design. These are assessed and relegated a score demonstrating how close the outline hopeful is to its objective. The most noteworthy scoring hopefuls are then duplicated to make another set of applicants. This procedure of assessing applicants, selecting the best, and making new way is rehashed until inevitably the by and large objective of the outline assignment is met.
One of the latest and most generally distinguished works in simulation outline is Wilhelms, J., and Van Gelder, work in 1997 on developing virtual animals (Wilhelms, J. and Van Gelder, 1997). Sims developed the morphology and a neural controller for changing motion behaviors of basic PC energized animals. The programming bundle utilized dynamic simulation to compute the development of the animals and had a parallel usage on a supercomputer to accelerate the calculation of the assessments for the hereditary calculation. (Vinson, V. et. al, 2012)

To apply these strategies to Physics Experiment it requires an increasingly in-depth analysis of the model and basic physics models. In 2000 Maldacena, developed a programming bundle “Black hole entropy” (Maldacena J. M., 2000) that permitted the programmed outline of different mechanical experiments, incorporating a controller and a strolling experiments for space trusses. Whilst the flow were more perplexing than that of Karl Sims work, the development of parameters was not tended to, and therefore the issues identifying with the actuality crevice were not researched.

1.4 Bridging The Gap:-

The simulation method used for the improve the students confidence and motivated them to learning engagement .It is also helped the students to recognize and correct their misconception and handle the difficulties by own way in case of formal to real circuit representations or practical to formal representations. It is good source of constructive feedback of students (Ronen, M., and Eliahu, 2000). There have been various methodologies endeavored in tackling the issues confronted when exchanging control from a mimicked environment to this present reality. There have been three fundamental methodologies for the further process:

● Traditional high constancy simulation. In the high loyalty reproduction approach the Physics Experiments is reenacted with however much precision as could be expected and after that control systems are tried in the recreation. These experiment frameworks have a tendency to just structure the groundwork for regulating the true experiments, and the basic framework is basically re-executed on the genuine actual experiments.
Minimal reenactment. With this approach just the basic parameters needed to input to a Physics Experiments' target conduct are faultlessly modeled. The different perspectives are just developed on a general level, and the parameter is advanced, for example to just depend on the basic parameters. When the more elevated parameters have been finished in the recreation the more level parameters are actualized in this present reality. This empowers the exchange of the elevated amount control programs without needing re-execution on this present virtual framework.

Physics Experiments equipment more and more. Reconciling parts of the Physics Experiments with the simulation framework takes into account a significantly more sensible representation of the issue undertaking, permitting a considerably more faultless simulation. This approach is comparative to the conventional development approach; aside from that actual experiments equipment is joined to enhance the Quality of the simulation.

There are favorable circumstances and burdens to the greater part of these approaches.

1.5 Need of the Current Research:

1. To perform experiments with physics at a large and generalized scale
2. To remove the constraint of cost incurred in purchasing the experiments, which is largely hampering the constraints of student being able to perform variety of experiments with varied constraints.
3. To provide a platform of online experimentation for the post graduate students and researchers which is not available today
4. The need emphasizes the aspect to make the learning of the subject easy, enlargeable and at the same time enjoyable to the researchers.
5. To use different software tools to enhance the possibility of experimental understanding of the subject by providing models specifically in the subjects with abstract concepts like quantum tunneling in Quantum physics.
6. To evaluate the possibilities of the values of the domains which are not possibly explored by the experimental limitations of time and instrumental range

7. The need is to primarily make the experimental concept visible by delimiting the constraints of time, space, cost and errors.

8. To provide simulative models for complex and dynamically varying physical systems and their complex dependent and independent variables forming a particular type of output at a time.

1.6 The specific objectives to achieve this main goal are identified as follows:

1. The objective of this research work is to analyze how java applets and Mat lab application system is designed and used to promote the learning and drilling students on basic concepts to reach mastery of physics. I centered chiefly on the java application and mat Lab type because it covers all and extra features of other languages.

2. The objective of this research to simplify a partially-competent separation model and complement a general purpose penetration theory in such a way that they can serve as java simulation and Mat lab based fundamental devices in various cases like we will study three cases in this thesis as:
   (a) Photoemission phenomenon with different cathode material and calculation of different parameters for it,
   (b) M verses H characteristics for different material with different number of solenoid,
   (c) The proposed spray pyrolysis experiments model of film development in a simulator development.

3. To make physics stream edification uncomplicated to put into practice wide-ranging research and to understand software technologies role to build the same.

4. To study and create real-world situations in physics lab with the help of java.

5. To study the cost effectiveness of virtual laboratory over a real experiment tool.
1.7 Overview of Simulation:

An early endeavor to advance parameters for legged motion was by Bak, P. et.al in 1997. To diminish the search and the expense of assessing physical/controller outlines the thought of Staged Evolution was presented. This permits the actual experiments to be advanced over various stages, beginning with advancing distinctive oscillators in the neural net and completing with the advancement of the complete stride.

This arranged methodology was adopted by Wilson et al., such that early stages of the controller advancement were done in a basic simulation, and the last stage was assessed on genuine experiments equipment. A comparable methodology was taken by Maldacena, J. M. (2000). These methodologies are strictly with support to hardware interfacing reenactment, since the recreation stage closes and afterward the fittings assessment starts. There is always relation between the virtual controller and this present real controller.

The auto business has put vigorously in making greatly faultless developments for various car parts. Ronen, M., and Eliahu, M. (2000) explored the contrasts between customary reproductions, equipment on top of it recreation, and prototyping methodologies for advancing control frameworks for Ford and Jaguar. They inferred that fittings on top of it reproduction can swap exorbitant models. Then again, they require remarkably models of the physical plant and gave constrained suitability outside of the plants tentatively checked and foreseeable info range.

Subsequently, the standard fittings tuned in strategy experiences comparative confinements to the customary recreation approach taken by Heinemeyer, S. (2012) in that second-request and unforeseen environment connections with the experiments are not conceivable, as the equipment insider savvy is set in obvious manner. Particular models of the automation framework are still needed; however models and impressive estimations of sensor and actuator information are not needed, as they are straight spoken to in findings.
1.7.1 Hardware Interfaced Simulations:

For developing the simulation environment (Figure 1.1), an alternate for advancing the physical experiments and at long last a studying calculation for changing the simulation model to better fit this present research information. For the development of the Physics Experiments, the developer furnishes a capacity demonstrating the capability of the framework to accomplish the goal. The simulation model is developed dependent upon the both virtual and actual mode, with respect to maintain the true Physics Experiment’s quality. Along with this, the errors between the test system and this present reality are gradually minimized until parameters can adequately maps the genuine

Comparative to the newer approach, the approach does not require broad genuine estimations for the basic parameters like mass, pressure, velocity etc.

The back to reality strategy was effectively sought developing a ball kicking for quadruped actual experiments. The advanced control framework was adequately exchanged to the true physics experiments findings, making this one of the few methodologies to effectively cross the actuality for a mind boggling actual experiments system (Pelinck, M. J., 2005).
An alternate methodology is the estimation investigation algorithm (EIA) specifically for the physics experiments developers on the data and comparability metric for the results. Given a surmised model of the target system, the EIA enters an investigation stage, in which the tests are developed to figure out the best test for the framework. The following stage is the estimation stages in which models are advanced that best clarify the connection between the inputs and yields of the system. These two stages are rehashed until it unites to an answer. This approach was connected to a four legged Physical Experiments, and the EIA was ready to develop a reproduction model speaking to the genuine experiments.
The attributes for physics virtual lab (VLab) and comparisons with existing desktop simulation tool are shown in Table 1.1. A high constancy simulation requires generally high developer experience, as the simulation might be effectively altered to incorporate or avoid another characteristic. The modifying exertion is very low as various standard devices exist that permitting a dynamic model of an experiments to be built. In any case, the part and multifaceted nature needed of the model is truly high.

Thus the procedure is exceedingly complicated to disparities between this present reality and the simulation, since any failure in the experiments model can decipher to a noteworthy slip in the experiment's motion restricting its appropriateness to semi static mechanism. Finally, due to the multifaceted nature of the model, the computational exertion of assessing the reproduction could be truly developed.

Insignificant simulations require prior experience, as the physics experiments developer must have the ability to detail which parts of the experiments and environment are to be acknowledged as a component of the base-set, and which are definitely not. As a result, the simulation model is regularly a streamlined design of a more complete accepted high impact virtual model, lessening the computational exertion for assessing the simulation.
<table>
<thead>
<tr>
<th></th>
<th>Physics VLab</th>
<th>Desktop Simulation</th>
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<tbody>
<tr>
<td>Developer Experience</td>
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<tr>
<td>Model Complexity</td>
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<td>High</td>
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<td>Programming Effort</td>
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<tr>
<td>Internet Application</td>
<td>Yes</td>
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Table 1.1 – Physics VLab comparisons with desktop tool

Separating the framework into base-set and implementation orientation significantly decreases the methods affectability to the actual development. Nonetheless, the test system must be explicitly built for the Physics Experiments and its significance to critical modifying exertion is needed by the Physics Experiments developer for developing the test system.

The standard finding on methodology likewise requires extensive hands-on experience to know which parts of the Physics Experiment and its background to develop in the virtual environment also which modules to simulate. Subsequently, the model multifaceted nature is regularly very low, as the most challenging segments to precisely model are considered to equipment. Thusly, the affectability of the technique to the actuality is either low or nonexistent and therefore, the computational
exertion in assessing the model is truly low. Since large portions of the Physics Experiment segments are available in equipment, the modifying exertion is normally confined to interface programs and a couple of supplementary parameters.

The desktop virtual experiment methodologies requires a complete form of the experiments equipment to be developed, and thus can't be utilized to advance a experiment’s outline. Besides, the EIA approach depends on a solitary test system and dependent upon the presumption that it can precisely display an extensive variety of scenarios. This is possibly correct. For an automated configuration approach just the universal high reproduction approach empowers the simulation of any experiment morphology, without needing impressive basic information or experiment’s equipment. The insignificant development approach requires the developer to deconstruct the issue into base-set viewpoints, and a standard equipment on top of it approach requires the proper sensors and controllers (for connecting actual experiment with computer) to be chosen and associated with the test system. The equipment on top of it technique subsequently requires no less than a fractional development of the experiment. This disadvantageous nature points the chance for building a complete experimental outline and regularly limits findings in self-governing plan methodologies to improvement of an existing experiment’s outline just.

The minimum simulation approach requires a test system to be explicitly developed for the specific undertaking. This extremely limits the result space and consequently lowers the choice of a self-ruling outline of the complete experimental plan, or of complex dynamical frameworks. In this way, minimum simulation is additionally an improper decision for a general physics experiment outline development.

There were two main intermittent domains in the issues highlighted by experiments and simulation researchers (Pelinck, M. J., et. al. 2005) with simulation and the actual model. These were hardware experiment models and the experiment flow. Gainful results have been proposed for the automatic systems are evaluated. Hestenes, D. (1997) proposes an answer for the experiments progress issue that is actual experiments, environment. The key acknowledgment in the minimum simulation approach was to diminish the development to a set of basic parameters that improves quality in both the simulation and present reality which the controller will depend
upon, and implementation of same. On the other hand, as this is a manual procedure of recognizing the basic parameters and implementation perspectives, there is no existing gainful solution for the major experiment.

This proposes a strategy for immediately combining the basic parameters and implementation parameters into a physics experiment simulation. This is realized by combining together different autonomous test systems.

Flawlessly modeling any true characteristic is not conceivable, even with watchful observational acceptance. Case in point, if the obscure likelihood dissemination of an underlying genuine procedure is modeled as a typical dispersion, then regardless of the possibility that it has the same mean and standard deviation there will be parts of this appropriation that have no groundwork as a general rule. Given that there is no immaculate reason for a certain physical characteristic, it will frequently be executed specially for every science test system.

Moreover, given that distinctive test systems are produced with diverse objectives, a few test systems might exactly show one characteristic, where an alternate test system makes an improved estimation.

Subsequently, every science test system will react somewhat contrastingly for an indistinguishable errand because of the contrasts in the models utilized and the execution portions of the science experiments. The parameters that will act likewise will viably structure a base-set for the framework, and those that contrast, will shape the implementation perspectives. By utilizing various test systems every perspective will involve an extent over the range from base set to implementation, as opposed to simply the double case.

This thought is represented in Figure 1.2. Also Figure 1.2 shows the characteristics of the present reality and the characteristics of a software system. A few characteristics of this present reality won't be communicated to by the test system.
Any control framework improved in the test system that relies on any of the characteristics that are just exhibit in the reproduced experiment, will inescapably come up further in this present study.

For every experimental framework, a score is relegated in each test system consistent with how well it achieves an undertaking. In the event that one test system furnishes altogether diverse action with the others, it is likely the system will appropriately diverse the output. By utilizing diverse output consolidating procedures the impact of
this test system might be minimized or invalidated. This requires an adjustment of the accepted evolutionary system outline procedure.

The methodology for the high performance simulation framework approach initiate with the development of a prototype of the physics experimental parameters (eg: calculation of geometrical areas, calculation of mass, velocity etc.), the environment and small java code for same. The evolutionary simulation development procedure is as follows:

1. Identify a set of potential physics parameters
2. Evaluate every parameter (mathematical or geometrical) configuration.
3. Develop pseudo code prior to develop java code framework.
4. Write java code to solve physics formulae specified for particular parameter. For example, if we want to simulate deformation of rubber sphere after collision, we first need to calculate area of sphere with knowledge of radius ‘r’.
5. Test the output of actual experiment and compare it with java program output.

The proposed development to this is to assess the outline for one test system, as well as rather on different test systems. This might presuppose developing the Physics Experiment and java program every time for every experiment or for every parameter.

To uproot this prolonged necessity, a simulation framework is needed that can convert an actual implementation framework representation to a valid representation for different physics experiment systems and furnish a solitary customizing interface.

With such a framework, the generalized simulation approach remains unaltered.

1.8 Research Methodology:

Research Methodology followed in deriving the simulation models is based following derived steps carefully designed and articulated as per the involuntary need of the concurrent research which help the researcher to have a comprehensive idea right from the collection of data, definition of need, process instrumentation followed thereof, Designing of experiment and actual treatment to collect the experimental
data, Comparison of parameters, defining parameters to be modulated as software programme in java, selection of a particular Java Script to performing successive iterations till final model is derived successfully.

1.8.1 Problem in Hand (Emphasis about the two experiments that are comprehensively undertaken as a simulation model):

The two experiments are selected as representative research level experiments to prove and emphasize the impotence, relevance of the simulation. The photoemission experiment with different cathode material is such an experiment which explains the quantum interaction of the photons with the photomissive surfaces. The parameters such as the wavelength of light used, intensity of the quanta striking on the surface, the definition of work function for different materials used, the effect of the temperature and duration on the quantum conversion into the photocurrent are such parameters which give a lot of analytical variety for the experiment to work about and subsequently collect the data for the same by applying calibration methodologies. Magnetic field and magnetization experiment is another research level experiment in which the calibration of parameters like the magnetic flux, change in the magnetic flux, Magnetic induction, and other prosperities of the ferromagnetic specimens are involved. The quadrant wise variability of the parameters which give rise to variety of parameters like retentivity and coercively are also needed to be analyzed. The variety of ways in which the magnetic specimen reacts to the change in the magnetic flux with reference to the change in the direction of current give ample variety at the experimenters end to try different celebrative strategies to collect variety of data.

1.8.2 Importance and Scope of the Selected Experiments for which the simulation model is designed:

This proposition addresses the advancement of a java programming framework and outline method for automated/simulated Physics Experiments architecture that permits simulation comes about to be dependably exchanged to genuine Physics
Experiments. As expressed by many authors, the key concern is the contrasts between the progress of the simulation and this present reality. (Harms, U., 2000.)

This issue has been examined widely in the Evolutionary Physics Experiments field. In this field, the methodology of exchanging physics parameters from a simulation to a genuine environment is regularly alluded to as replicating originality (GW Robinson (Ed.), 1996). Hestenes, D. (1997) layout three key hindrances to defeating the actuality crevice:

a) Different physics parameters, regardless of the fact that clearly indistinguishable, might perform distinctively in view of slight contrasts in the gadgets or mechanics, indeed, when presented to the same outer environment.

b) Physics parameters convey dubious qualities, and charges to environmental factors have unverifiable impacts (ex: effect of temperature on wire material).

c) The assemblage of the experiments and the qualities of environmental factors require precise proliferation in the simulation.

This theory will concentrate on the right propagation of the Physical Experiments. The concerns identifying with the questionable matter of the execution distinctions in the parameters and the delegate models have as of recently been widely examined by different scientists and won’t be explored here (Harms, U., 2000.).

Since the aim of this proposition is to make a general approach relevant to any Physics Experiments various material science simulations will be tended to incorporating those concerning inflexible form progress and computational liquid flow for case study of spray pyrolysis experiment. A few confinements should be made on the base of these simulation models, incorporating motion, mass, velocity and experimental modeling, and force dispersion.

As simulated configuration methods require many outline assessments, it is vital to think about the computational productivity of the physics experiment. In this manner the progress models utilized will regularly upgraded models of this present reality, whilst still acknowledged to be physically legitimate (Heinemeyer, S., 2012). It is
paramount to quantify how they inexact this present reality material science and this subject will be examined in profundity.

The execution qualities of the mechanized outline framework itself won't be treated in part. There is progressing research into enhancing the execution of atomized configuration procedures and evolutionary calculations, for example hereditary calculations, and this is to a great extent recognized to be past the extent of this postulation. (Inoue, K., and Sakai, M., 2012)

As this proposition is kept tabs on the legitimate reenactment of nature's turf and the Physical Experiments' flow, the advanced control frameworks will just think about more level velocity control issues and behaviors. Physical Experiments morphology, sensor and actuator situation, and more elevated amount assignments, for example movement arranging won't be acknowledged. (Liu, F., Wang et. al, 2010)

There are some distinctive methods for judging if a controller effectively moves into actuality in the wake of being developed in a reproduction (Gerhardt, S. et. al, 2012). A few systems give immediate quantitative examinations between simulation and actuality, others furnish a more subjective perspective. For the most part, the presentation of the output will rely on upon the mechanized outline process and Physical Experiments control systems. The controller parameters (mass, velocity, pressure etc.) in this theory will be assessed consistent with more elevated amount quantitative correlations and qualitative analysis.

The characteristics for the modeling mechanism techniques bestowed on top are needed to consider. A modern approach like java technology development needs comparatively very less number of developers or expertise, because the experiment may be simply changed to incorporate or exclude a new feature. The programming effort is kind of low as we need to develop separate code for each physics experiment.

Exact coding need intensive expertise, because the automaton developer should be able to specify that aspects of the automaton and setting are to be thought-about as a part of the base parameters set, and that don't seem to be. As a consequence, the basic model is commonly a simplified version of an additional complete model, reducing the procedure effort for evaluating the replication.
Differentiating the replication into basic physical experiment and software implementation aspects greatly reduces the processes sensitivity to the fact gap. However, the software should be specifically created for the automaton and its specific setting, which means a big programming effort, is needed by the automaton developer for constructing the experimental set up.

The standard hardware method conjointly needs substantial expertise to grasp those elements of the automaton and its setting to reconstruct within the physical world and that element to simulate. As a result, the model complexity is usually quite low, because the most troublesome parts to accurately model are delineated in hardware. Therefore, the sensitivity of the tactic to the fact gap is either low or nonexistent (depending on the quantity of parts simulated) and afterward, the procedure effort in evaluating the model is low. Since several of the automaton parts are present in experimental hardware, the programming effort is usually restricted to hardware interface programs and some replication parts.

The hybrid methods needs a whole version of the automaton hardware to be created, and so cannot be used to evolve an experiment’s hardware specification. This research addresses the event of a software and design technique for machine-driven mechanism design that enables simulated results to be faithfully transferred to real automatons. As declared previously, the key matter is that the variations between the actual experimentation and the software replication are important for future study. This drawback has been studied extensively within the literature survey process. During this field, the method of transferring a hardware controller to a software replication to a true atmosphere is usually named as “research gaps” we can define key obstacles to overcoming the research gaps:

a) Completely different physical sensors and mechanical parts, although apparently identical, could perform otherwise as a result of slight variations within the electronics or mechanics, even once exposed to equivalent external information.

b) Physical sensors deliver unsure values, and commands to mechanical parts have unsure effects.

c) The body of the experiment and therefore the characteristics of the setting need correct copy within the replication.
This research will concentrate on the right copy of the simple experiment and setting. The considerations regarding the uncertainty of the performance variations within the components and therefore the representative simulation models have already been studied by different researchers and cannot be investigated here.

Since the aim of this research is a general method applicable to any physics experiment, varieties of physics replication topics are going to be. Some restrictions shall be created on the detail of those replication models, as well as basic physics, elaborate device and mechanism modeling.

As physical-controlled techniques need thousands of evaluations, it's vital to think about the experiment potency of the physics model. Therefore the models used can regularly be simplified models of the actual world, while still accepted to be physically valid. It’s imperative to quantify however to approximate the actual world’s physics and this subject are going to be investigated thorough.

The performance characteristics of the photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments system itself won't be treated intimately. There’s in progress analysis into raising the performance of the photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments techniques and related process algorithms, like genetic algorithms, and this can be for the most part thought-about to be on the far side the scope of this research. As this research is concentrated on the valid replication of the setting and also the photoemission experiment with different cathode material, magnetic field and magnetization experiment and spray pyrolysis experiments method, the evolved management systems can solely think about lower level experimentation management issues and behaviors. Automaton morphology, device and mechanism placement, and better level tasks like droplet nozzle designing won't be thought-about.

There are many other ways of decision making whether or not a controller with success transfers into reality when being evolved in an exceedingly replication. Some authors give direct quantitative comparisons between replications and reality, others give an additional subjective method but there are no references for The photoemission experiment with different cathode material, magnetic field and
magnetization experiment and spray pyrolysis experiments modeling. Generally, the presentation of the results can rely on the software-controlled method and automaton management task. The software controllers during this research are going to be evaluated in keeping with higher level quantitative comparisons and analysis.

For an automatic method solely the standard modern replication method permits the replication of any automaton experiment, while not requiring in depth developer input or automaton hardware. The marginal replication method needs the developer to interpret the matter into base parameters and a regular hardware within the loop method needs the suitable components to be designated and connected to the simulated machine. The software within the loop methodology thus needs a negligible of a construction of the experiment. This limits the chance for constructing a whole hardware set up and usually restricts hardware within the loop autonomous methods to optimization of an existing automaton solely.

The marginal replication method needs a machine to be specifically created for the actual task. This severely restricts the solution and thereby eliminates the choice of an autonomous style of the entire automaton or of advanced systems. Thus, marginal replication is additionally an inappropriate selection for a general automaton style package. So we need fully automatic software solution for experimentation.

1.8.3 Organization where the work was carried out (Product process and profile):

The experimental model based on simulation pertinent to Photoemission phenomenon Apparatus and simulation experimental model of M-H curve experiment which were practically and imbibed to practice on the basis of experimental reading on actual experiments that were constrained and performed with the available laboratory instrumentation of Photoemission phenomenon Apparatus and M-H curve experiment Apparatus. All these set of experiments were calibrated and carried out at Saraswati College of Engineering, Kharghar Navi Mumbai campus.
1.8.3.1 Profile of the instrument being used for the current research:

1.8.3.1.1 Photoemission phenomenon Apparatus set:

The Research instrument used was PASCO instruments Made Planks constant Unit (Photoemission phenomenon Apparatus Model No. AP-8209, PASCO Products) bearing dead stock No S.C.O.E./APP.PHY/PKCS/01/08-09 GPR NO 180/P-85 and Purchase Order No AC/055/2008 Challan and bill no AC/055/08 in the academic year 2008-2009 dated 12/12/2008 at a cost of 27,390 by the organization.

- Instrument Profile:
  - The given apparatus AP-8209 is the instrument known to be “Photoemission phenomenon Apparatus”
  - The used instrument includes the subunits named as Mercury Light Source, A Base, and An Enclosure for the Photodiode tube, Testing instrument, Miscellaneous Cords and Connecting Cables, Standard Regulated power supply, Mercury Light resource, an aperture box, Screws for alignment.
  - The given instrument has several important features to describe. The Current amplifier associated with the current instrument has a considerable and significant sensitivity. The current amplifier is very stable and has a considerable accuracy.
  - The component of Reverse current related to anode is very less
  - The component of dark current associated with the instrument is also very less.
  - Use of fiber optic cables is made in order to have high quality of the quantum transfer. This allows high quality light transmission. This avoids undue interference between the spectral wavelengths.
• Process:-
  ➢ The instrument The AP-8209 Photoemission phenomenon Apparatus was calibrated to the Set and expected standards.
  ➢ Calibrated Reading sets of wavelength of emission of photons VS Photocurrent was performed for various Cathode materials Viz. Aluminum, Calcium, Copper, Iron, Magnesium, Sodium, Zinc, Barium, CsNaK3Sb, Potassium
  ➢ The best reading sets were selected by continuous repetition and method of averages to select the best readings among the selected near approximates.
  ➢ The dependent and independent variables were defined. Symbolism for the simulation modeling was done and concurrently applied to the variables

• Product:
  ➢ The requisite Simulation Model of Photoemission phenomenon was developed.
  ➢ The created model was tested for various real inputs to test the trustworthiness of the output.
  ➢ The model was calibrated to the real time outputs.
  ➢ The model becomes ready as a viable research alternative for the post graduate students as well as researchers for various combinations of readings that they desirably want to exhibit for the outputs and applications to be further designed.

1.8.3.1.2 M-H curve experiment complete set:-
The Research instrument used was Scientific Equipment & Services Made Hysteresis curve Apparatus complete set (HYSTERESIS LOOP TRACER Model: HLT-111) bearing dead stock No S.C.O.E./APP.PHY/HCA/01/08-09 GPR NO 180/P-85 and Purchase Order No AC/055/2008 Challan and bill no AC/055/08 in the academic year 2008-2009 dated 12/12/2008 at a cost of 14,500 by the organization.
• Instrument Profile :
The study of magneto statics and the factors thereof are comprehensively
studies, calculated, calibrated. The important factors like the hysteresis loss
and the retentivity and other concurrent factors like the coercivity and the
magnetization and the level of saturation are some of the important factors that
can be known through proper application of this instrument.
There are various methodologies that can be applied to study the above
mentioned properties. The Slow and Laborious methods by the use of the
ballistic galvanometer can be traced.
As far as the emblematic representation is concerned, one can state that The
Loop tracing mechanism base on AC values of the current does warrant for
the use of the ring form of the sample. At times the wire type or the rock type
samples are also being used.
It is very difficult to make/ prepare ring type samples. However these samples
are effective in their use. The other type of samples is easy to be prepared,
however in those shapes one does find the lacuna or the defect of
demagnetization. The samples having various values of the diameters and the
values of the eddy currents as output can be accommodated in the present set
up.
The entire ranges of the magnetic parameters that can possibly be measured
are listed below.
  ✤ Hysteresis loss
  ✤ Receptivity
  ✤ Saturation magnetization Coercivity
  ✤ Receptivity
  ✤ Saturation magnetization
  ✤ Various magnetic phase identification

• Process:-
  ➢ The instrument HYSTERESIS LOOP TRACER was calibrated to the
    Set and expected standards.
  ➢ Calibrated Reading sets of Magnetic field VS Intensity of
    Magnetization Were taken for various values of magnetic fields. The best
reading averages were selected by continuous repetition to select the best readings among the selected near approximates.

- The dependent and independent variables were defined. Symbolism for the simulation modeling was done and concurrently applied to the variables.

- Product:
  - The requisite Simulation Model of Hysteresis curve was developed.
  - The created model was tested for various real inputs to test the trustworthiness of the output.
  - The model was calibrated to the real time outputs.
  - The model becomes ready as a viable research alternative for the post graduate students as well as researchers for various combinations of readings that they desirably want to exhibit for the outputs and applications to be further designed.

1.8.3.1.3 Spray Pyrolysis unit:

The Research instrument used was Hall Mark Made Spray Pyrolysis Unit [ Model No: HO-TH-04A ] bearing dead stock No S.C.O.E./APP.PHY/SPRAY PYRO./01/09-10 GPR NO 289/P-473 and Purchase Order No AC/0159/10 Challan and bill no AC/0159/10 in the academic year 2009-2010 dated 21/08/2010 at a cost of 3,7500 by the organization.

- Instrument Profile:
  This also provides a larger the given model is the automatic and latest version of the Holmarc’s line of Spray Pyrolysis Units. The used model is the expanded version of the previous version and is a standard version with a provision to provided larger capacity and area to spray as well as increased speed and control of the spray head.
  Large area of spray coat is easily covered in this model which a prerequisite for many standard applications. The current model does provide an opportunity to handle large spray area and volume of the spray elucidation.
The model has comprehensively substantial convenience to handle and it does provide better efficiency of spray variety of elucidations. The given model is a handy unit wherein the upper top can be separated from the base and the entire unit then becomes a easy to handle table top unit. The given unit does have an additional feature of a pump mechanism for nitrogen as a spray gas along with the antecedent elucidation for a better spray in case of an ESD approach.

• Product and process:-
  - The instrument Spray Pyrolysis unit was calibrated to the Set and expected standards.
  - Calibrated instrument was set to deposition of various material films.
  - The Simulation variables such as the Deposition temperature, the Spray deposition time, and the Spray deposition density were defined as variables.
  - The simulation model Architecture was Initiated.

1.8.4 Identifying basic parameters involved: In this step various basic physical parameters of the two research base experiments on the basis of which the further simulation model is going to be designed are analyzed and critically separated out of the collected variety of experimentally collected entire range of data in the “The photoemission experiment with different cathode material” and the second experiment “Magnetic field and magnetization experiment” Another specific research level experiment is done and generically analyzed for a successful simulation model to be designed. This experiment is “Study of Architecture and design parameters of the Spray pyrolysis Experiment and its consequent impact on the quality of the derived slim film” (Analytical discussions on derived data).

1.8.5.1 Analysis about the Need of Simulation in the Experiment “The photoemission experiment with different cathode material”: According to fundamental concept of quantum mechanics, the light has dual nature. In case of photoemission effect, the particle nature of light is vital part of this phenomenon hence understanding of this concept is most important for understanding the complete
phenomenon of photoemission effect. The photoemission phenomenon concept and experiment is one of the good and most important ways for the student to understand the photon concept of light and to explore their ideas related of photon model. The photoemission concept and experiment, the physics faculty consider as very easy concept of modern physics, are explained in short manner in theory lecture as well as in practical of modern physics and quantum physics but on the other hand, the research shows that student has poor understanding of this topic and they have lots of difficulties for the understanding of the basic things of this concept like the experimental set-up, experimental results, and inferences regarding the nature of light. Thus there is need of simulation based model of photoemission effect to deal with this problem of students.

1.8.5.2 Analysis about the Need of Simulation in the Experiment “Magnetic field and magnetization experiment”:

In the modeling of hysteresis loop has been carried out because angle of it has different application in different areas for example in broad band transformer. Above mention each application depends upon the nature of hysteresis loop and hence for each application area demands simulated hysteresis loop, as a result simulation hysteresis model requirement for each application. Functioning simulation model is developed on only hysteresis concept but in scope of future it can be extended in concept of magnetic material model for characterization, magnetic material model for optimization, simulation of system. The basic aim of this chapter is to make available java based computer simulation model for hysteresis phenomenon of magnetic material with efficiently and accurately. In magnetic studies, some of the characteristic are strongly requires like exact information of magnetic parameters and finding methods of them. These parameters are not only very important as per the academic point of view but also they are very important for manufacturers and magnetic material users. For defining the quality of magnetic material commonly four parameters are used that are value of coercivity, receptivity of the magnetic material after removing external magnetic field, saturation of magnetization at high value of applied magnetic field and hysteresis loss. Along with these one characteristic also required that is a number of magnetic phases present in system which is useful for understanding magnetic substance performance and for improvement of quality of substance. The above mentioned all the characteristics of
magnetic substance can be measure from the hysteresis curve. In practical methods of hysteresis tracer requires different forms of sample like ring, thin film, wires, rocks or mineral forms but the most useful form of sample is ring or Toroidal in which the arrangement of magnetic circuit is closed and hence there is no chance of demagnetization process. Practically it is not possible to design all material in ring forms without free ends. In case of open magnetic circuit samples, the free ends produces demagnetizing effects and hence applied field of specimen decreases and it causes non uniform field around specimen. That is why in case of magnetic material requires the reduced hysteresis loop. Eddy current is one of a factor generated due to the periodic variation in external magnetic field surrounding the specimen and it creates different extra issues in conducting ferromagnetism process. These current produces extra magnetic field in the sample and that magnetic field neutralizes changes of the external field because these field is having different value of magnitude and phase from the applied field. The eddy current also produces resistive heating of the substance and makes the different in the path of forward and backward of magnetic field near saturation. And hence it replaces horizontal line with a small loop in graph of magnetic polarization (J) verses magnetic field (H).A retentivity is the intercept on magnetic polarization axis and saturation point is the tip of magnetic polarization at which the value of magnetic field becomes very high. From above discussion, retentivity (Jr) of the magnetic substance and value of saturation magnetic polarization (Js) are the intercept value on J and height of tip respectively. The exact value of coercivity obtained from the intercept of H axis is equal to zero when the value of eddy current becomes zero. And hence the value of eddy current will be more for thicker sample as compare to slim one.

1. **Primary Data or Sample readings of actual experiment**: for the development of any simulation, there is requirement of primary data, the collection of primary data has been done from the actual experimental of above mentioned cases.

2. **Evaluate every parameter for test experiment**: Development of an effective and systematic calculation methodology for the development of the
photoemission experiment with different cathode material, magnetic field and magnetization experiment.

3. Use sample readings of actual experiment and store it in database
4. Apply simulation and compare simulation results against database results.
5. Return to Step 5, until the results get matched with database results.

A calculation is utilized to adjust the simulation output to better fit these present experimental observations. In the proposed different test system approach, a solitary evolutionary calculation advances a simulation framework assessed in various test systems and is coupled with a factual fitness assessment strategy. This viably couples the analyzing calculation and evolutionary calculation structure from the existing structural planning, bringing about a new simulation planning.

The rest of this theory depicts the outline, hypothesis and usage of the various simulation standards proposed in this thesis. This basically concentrates on the Physics Experiment Implementation Strategy, the programming developed for this thesis that interfaces to numerous physics test systems.

1.9 Alienate of thesis:-

This Thesis is alienated Into Three Fragments:

Part I

This part covers the first three chapters that which gives an introduction and the essential information related to understanding of the simulation concept.

Chapter 1 provides the detail introduction to this simulation concept and their need. This chapter encloses purpose of this thesis and framework of this thesis.
Chapter 2 gives a brief description of literature review of computer modelling and simulation which contains detail study of simulation and also contains use of simulation in science and physics education in India and abroad.

Chapter 3 describes the methodology and different methods for development of simulation model with different steps used in this thesis.

Part II

The second part consists of the three chapters that describe the main task of this thesis, which is to build and simulate different process models mentioned in chapter 4, 5, 6.

Chapter 4 describes detail study of the experimental setup and procedure for collecting the primary data of first case of photoemission phenomenon on the basis of different target materials and of second case of Band H curve for magnetic material because this primary data requires for the development of simulation model of said cases.

Chapter 5 In this chapter we have articulates development of simulation model by using experimental reading of the chapter-4, First case study of photoemission phenomenon on the basis of different target materials simulation processes that have been designed developed and investigated during this simulation study, the creation development and the platform process on the basis java programming. It also contains the results and analysis from the simulation. It presents an assessment of different simulation relation with actual experimentation and highlights the diverse competencies of research and their relevance to assessing Physics Experiment Simulation. It also includes second case study of Band H curve for magnetic materials and their result discussion. It also contains the results and analysis from the simulation

Chapter 6 explains architecture and design parameters of the Spray pyrolysis Experiment the carrying out of the simulation study of the spray pyrolysis thin film deposition technique and their java code development.
Part III

Chapter: 7: The ending of the thesis describes the outcomes of simulation modeling which consist the appraisal of the used simulation tool, a summary and recommendations for future work that is Summary gains, Limitations, and Recommendations & Scope for further works