**WEEKLY PROGRESS REPORT**

**(for students working from home)**

**M.Tech. 2nd year /Ph.D , Session:2021-2022**

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| **Course:-M Tech** | **Branch & Year:-Information Security 2nd year** |
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| **Thesis Title:-Software Component Identification and Composition using clustering** | |

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| **Month** | **Week** | **Work done (description)** | **Remarks of the Supervisor** |
|  | **I** | **Read 12 papers related to clustering techniques used in identification and composition of software components to get a general idea about previous related works and techniques used.**  **The 2 base papers for our thesis uses formal methods for constructing a software component library. Software components are specified using predicate logic. The specification corresponds to specifying abstract data type and a set of methods that operate on it. Each method is specified by interface ,type declarations , preconditions and post conditions. These components are then made to classify set of components subsumption test algorithm.**  **After getting lower level hierarchy of software components , higher level hierarchy is made using clustering algorithmn. The clustering is done using similarity between components.**  **The result is a hierarchy of software components that make it easier to search and reuse.**  **Some other component identification methods studied were clustering using high cohesion and low coupling strategy.**  **Another paper suggested combing clustering and genetic algorithms for component identification. The conclusion found by merging both the methods was that it has better performance in medium scale systems but not good in high scale and small scale systems. The paper uses mapping of object models and components to specify a component.**  **Another paper used use cases to extract features such as number of actors ,entity classes ,control classes etc. and compared the number of components formed from different types of clustering algorithms such as hierarchical , square error based, RB,RBR ,graph based , fuzzy and neural network based. The number of components formed were matched with an expert and the error percentage was calculated for every method of clustering.**  **Some papers focussed on component selection based on certain business requirements. Components were selected using genetic algorithm techniques and also traditional search based techniques. In evolutionary techniques the requirements are represented as chromosomes and values of ith gene represents component satisfying ith requirement.** |  |
| **II** | **Prepared Colloquim report on the topic software component idetification and composition using clustering based approach.The report was prepared from the papers and survey reports i read in the previous week.The first page consisted of abstract which gives a short description about the problem and what the main approach of my thesis work will be. My work will be using formal methods for constructing a software component library. Software components are specified using predicate logic . These software components will then be grouped according to hierarchy and similarity and clustering will be done. The introduction part of the report consists of various approachs already performed to identify software components. it includes genetic algorithmn based approach, K - means clustering , fuzzy and neural network based clustering, combination of both genetic and clustering algorithmns. We mentioned a short description about all the methods and their respective advantages and disadvantages.In the last part of the report we introduced our approach to component identification problem , a detailed description about how clustering will be used to identify software components in an hierarchial manner for easy storage , search and retrieval of software components.** |  |
| **III** | **Completed the colloquium report along with colloquium presentation.Taking forward the report made last week , implemented the changes that was suggested.added future research considerations as software composition using the software components identified. Added motivation and short and detailed description about various component identification techniques used**  **Since the component identified needs to be used to create a software system component needs to thought in terms of architectures and scripts.Studied a particular paper for software composition that implemented a FORM calculus method which is an asynchronous pi calculus. The pi calculus is found to be well suited for modelling encapsulation , composition and type issues.It is well developed theoretical foundation.This pi calculus creates a new language that will work on composition of software components using software component library.In software composition methods a critical issue that was found is that of symmetry and asymmetry.Studied a paper comparing symmetry and asymmetry based methods of software composition.asymmetric composition aspects are composed into components into will implement a base model.while symmetric does not distinguish between aspect and component and does not require a base model.** |  |
| **IV** |  |  |

Progress of the student is Satisfactory / Not satisfactory

**(Thesis Supervisor)**

**Name**:-Prof. D. K. Yadav

**Department:CSED**

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| **Forwarded by: Convener-DMPC / DDPC** | **Head of Department** |
| **Dated:** | **Dated** |