CSE-360

Integrated Design Project (IDP) Sessional

CAPSTONE FOR CSE PROGRAM

- Duration : 2 Terms (14 + 14 weeks)
- Credit Hour: 4.50 (1.5 in 3-2 + 3 in 4-1)

Capstone Project

- A capstone is the top and last stone in a building. Similarly, a capstone course is usually the peak and last experience for students in a higher education program.

- Originally a capstone course may have been viewed as a "finishing touch" to provide students with the needed information or skills before graduation, hence the name "capstone".

Capstone Project

- Capstone courses and experiences are the "**culminating experiences** in which students synthesize subject-matter knowledge they have acquired, integrate cross-disciplinary knowledge, and connect theory and application in preparation for entry into a career."

❖ Can be of two types:

- ❖ In-house project within department over a research topic
- ❖ Live project carried out at an industry over a real-time industry problem

In-house Project Idea Example

Zelda-inspired Mobile Application Controlled Home Automation

- Certain ringtones/ sounds are played in a specific sequence and triggers the action related to the specific task.
- Helpful for senior citizens, disabled people

Industry Problem Project Idea Example

Electronic Voting Machine (EVM)

- EVM was implemented by a group of students from BUET in collaboration with Bangladesh Election Commission.

COURSE OUTCOMES (COs)

Students should be able to -

- CO1: Develop systems' requirement specification from top-level customer requirements.
- CO2: Analyze and compare design alternatives, at the system and subsystem levels, and use measures of performance or other criteria to rank alternatives.
- CO3: Plan and organize an engineering design project using tools such as Gantt charts to develop a work breakdown structure, develop a schedule including milestones, and estimate effort and costs incorporating the ethical, financial and environmental issues.
- CO4: Develop a design concept and elaborate it through to a detailed design by decomposing a system concept into component subsystems, identifying the subsystem requirements and applicable standards, and defining interfaces between the subsystems.
- CO5: Build prototypes of key subsystems.

Steps to Follow for Achieving COs

- CO1: Interacting with stakeholders to discover their requirements.
- CO2: Gathering information about the existing systems, perform literature review to rank their feasibilities.
- CO3: Establish a methodology using advanced tools / techniques to develop a work breakdown structure including cost and milestones.
- CO4: Design the system, break it down to sub systems, define interfaces between the subsystems and its requirements.
- CO5: Build an initial version of the system, a prototype, which will be used to demonstrate concepts and try out design options.

DOMAINS

- Theoretical CS and Algorithms
- Networking
- Database and Data Mining
- Cloud Computing and Big Data
- AI and Robotics
- Computer Vision
- Information Security
- Pattern Recognition
- Internet of Things (IoT)
- Human Computer Interactions (HCI)
- Image Processing

COURSE CONDUCTION PROCESS

TOPIC COLLECTION IN TWO MODES

- For in-house projects, the topics/problems are collected from students with the consultancy of the faculty members. The students then make groups and select topics from the list.

- Students may opt for a live industry project. The projects/problems may be brought in by department/students. Once these processes are done, students will finalize their topics which will be intimated to the concerned industry.

PROCESS OVERVIEW

*Each phase will have necessary presentation and evaluation

Incorporate changes if necessary

Incorporate changes if necessary

Phase 1
- Topic Submission

Training 1

Phase 2
- Objective
- Methodology
- Literature Review

Phase 3
- Design & Partial Implementation (Prototype/Demo)

Training 2

Phase 4
- Complete Implementation
- Testing & Result Analysis
- Report Generation

Phase 5
- Report Evaluation
- Final Observation & Correction

Training 3

Final Evaluation
- Evaluation Committee (Supervisor + Other members)

TIMELINE

	Week	Phase	Remark
1st Semester	1	Interactive Lecture Session on Topic Selection	
	2	Phase 1 - Topic Selection and Project Plan (Presentation)	
	3	Phase 2 – Literature Study, Tentative Methodology, Analysis and Modeling and Required Components' List	
	4-5	Phase 3 – Detailed Design & Initial Prototype Submission	
	6	Phase 3 – Evaluation and Feedback	
	7-8	Phase 4 – Prototype Enhancement	
	9-10	Phase 4 – Implementation of UI- Initial Submission	
	11-12	Phase 4 – Complete Implementation of UI	
	13-14	Final Submission with proper documentation and Poster Presentation	

PHASE 1 - INITIALIZATION

- Project teams will finalize their topics, submit a synopsis presenting the methodology, objectives and scope of the project. Rubrics are defined for the evaluation.
- Contribution of the project towards the society, environment, inter-disciplinary scope are considered during the evaluation. Emphasis will be given on the use and practice of ethical values and professional codes.

PHASE 2 - METHODOLOGY

- The students present a detailed methodology of the project to the faculties. If the methodology is not appropriate or there is a better way to conduct the experiments, the teams are advised about the changes.
- Emphasis is given on literature review and research gaps.
- Phase 2 also encourages the students to demonstrate project management skills in the form of project planning and job distributions amongst the team members.
- Students present the project planning in the form of a Gantt chart, i.e. a pictorial representation of the project plan with milestones and the planned dates of completion of each milestone.

PHASE 3 - DESIGN

- Phase 3 is the design phase where the students present a high level design and a detailed design of the project with the help of Data Flow Diagrams (DFDs), structure charts, flow charts and module descriptions.
- The committee evaluates the design and gives a feedback about it.
- Suggested changes, if any, are incorporated at this stage.
- Both the guide and the committee evaluate the work presented based on the rubrics.

PHASE 4 - IMPLEMENTATION

- The project teams demonstrate the complete implementation of the modules, unit testing and integration testing with relevant result analyses.
- Students present the implementation of the project to the committee with the results of the testing.
- If any modifications are required in the implementation, students are given a week time to make these modifications.
- Students show a demo of their project during the presentation.
- Both the guide and committee members evaluate the work carried out by the students based on rubrics.

Project Milestones & Assessment Procedure

Click here to view the Project Milestones & Assessment Procedure

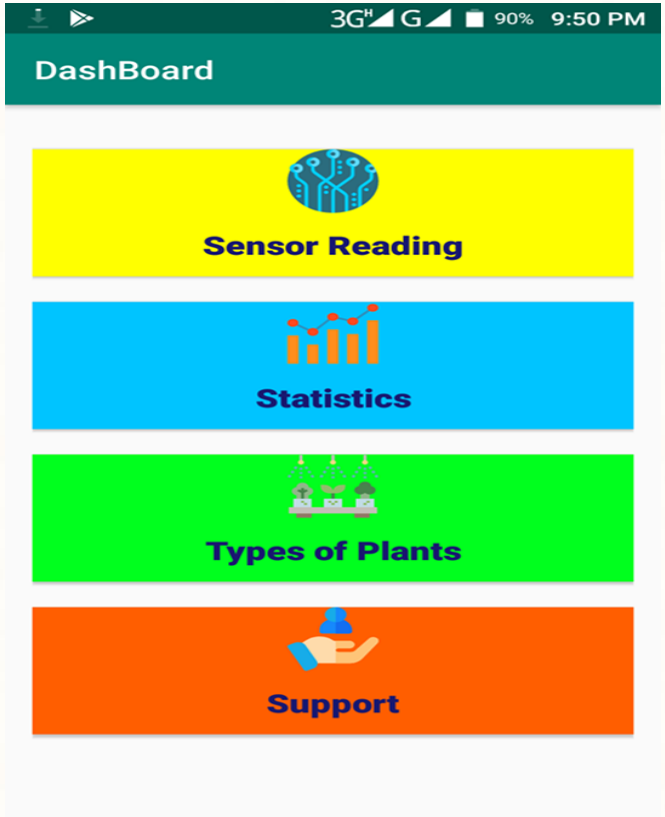
Some Ongoing Projects

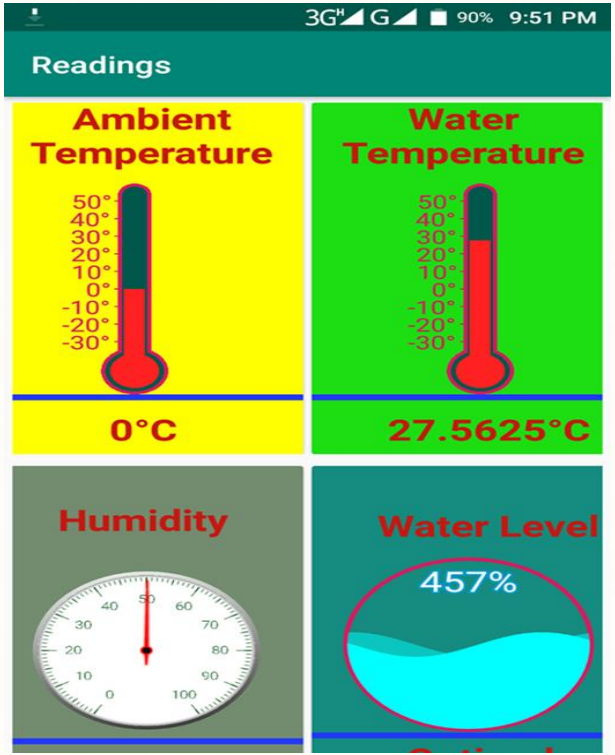
Automated Hydroponic System (Hardware)

Click here to see the full project prototype video

Some Ongoing Projects

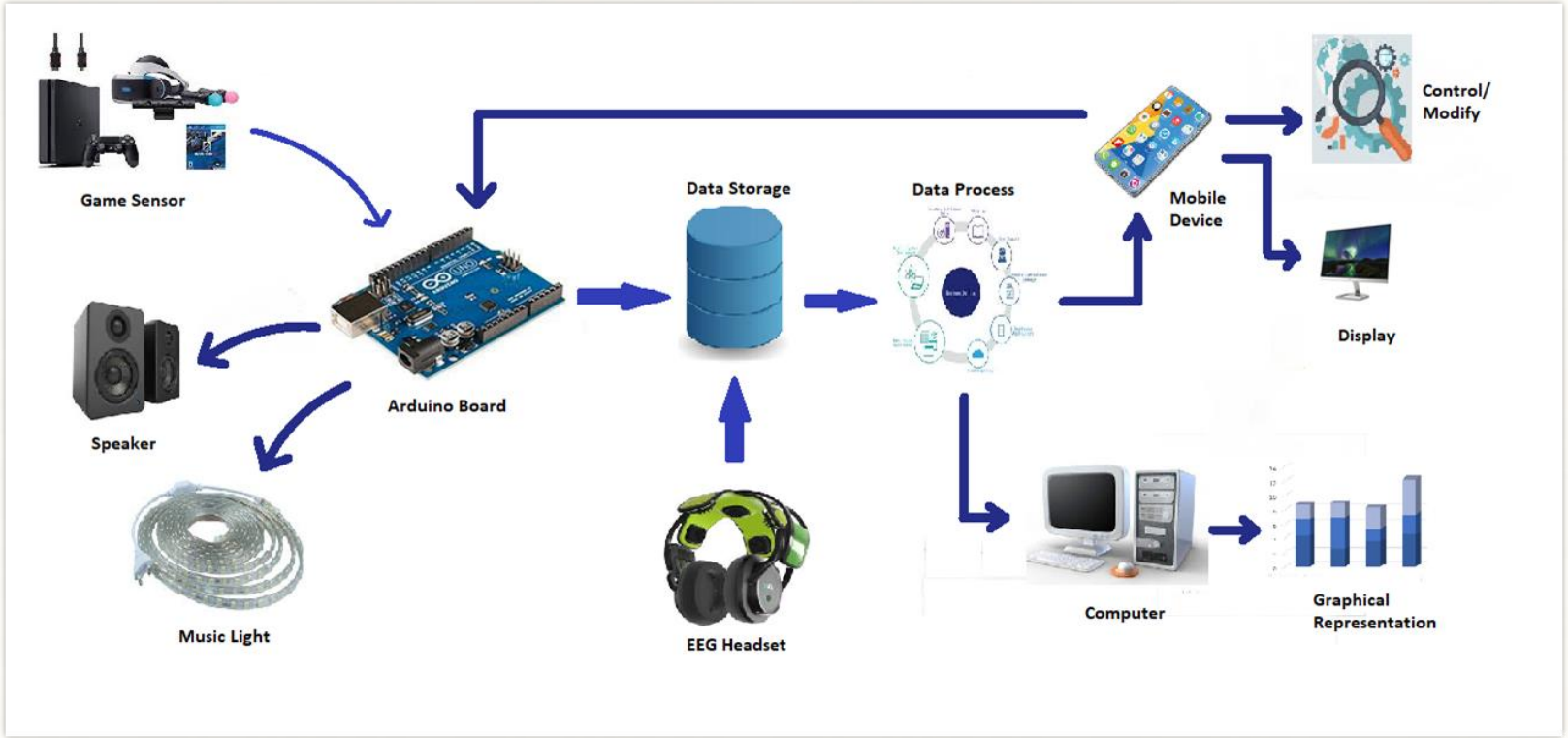
Automated Hydroponic System (Software)





Some Ongoing Projects

Development Tool for Mentally Challenged Children (System Architecture)



Some Ongoing Projects

Development Tool for Mentally Challenged Children

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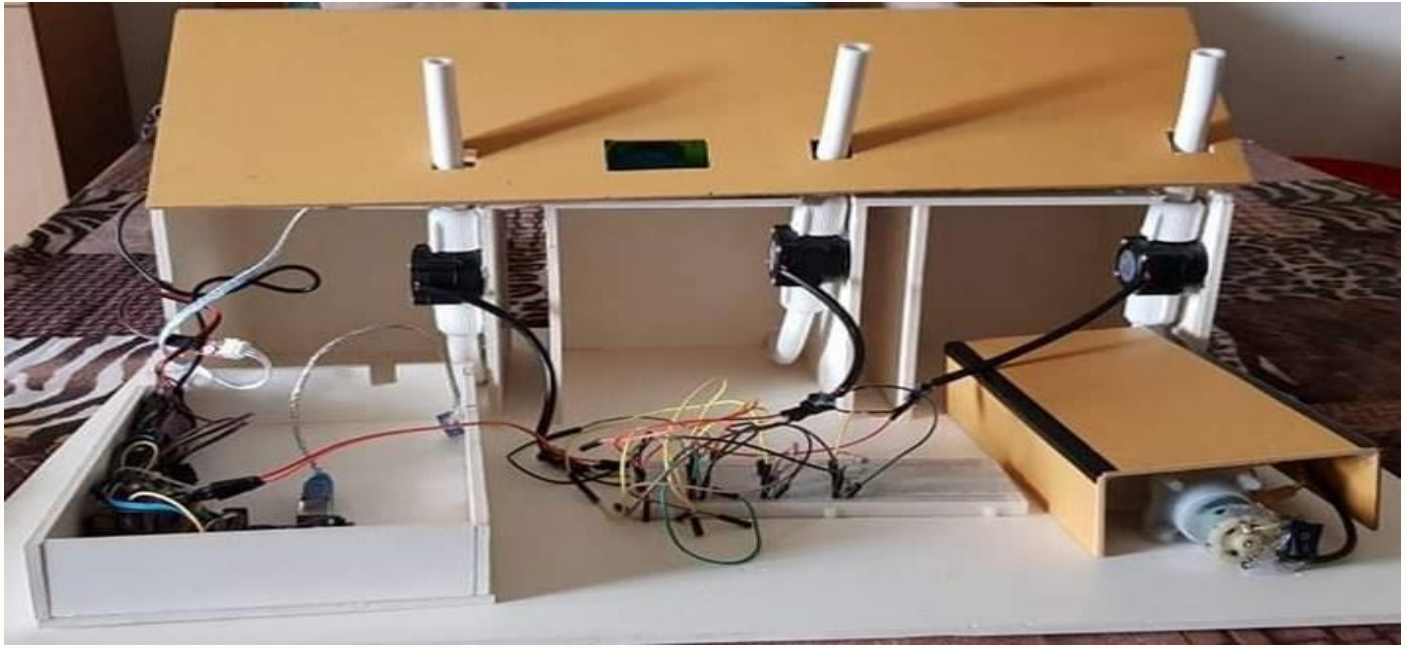
Some Ongoing Projects

Domestic Water Supply, Billing and Quality Measurement System (Hardware)



Click here to see the full project prototype video

Some Ongoing Projects

Domestic Water Supply, Billing and Quality Measurement System (Software)

MIST Home Purpose Sensor Data Logout

Generate Flat One bill | Generate Flat Two bill | Generate Flat Three bill

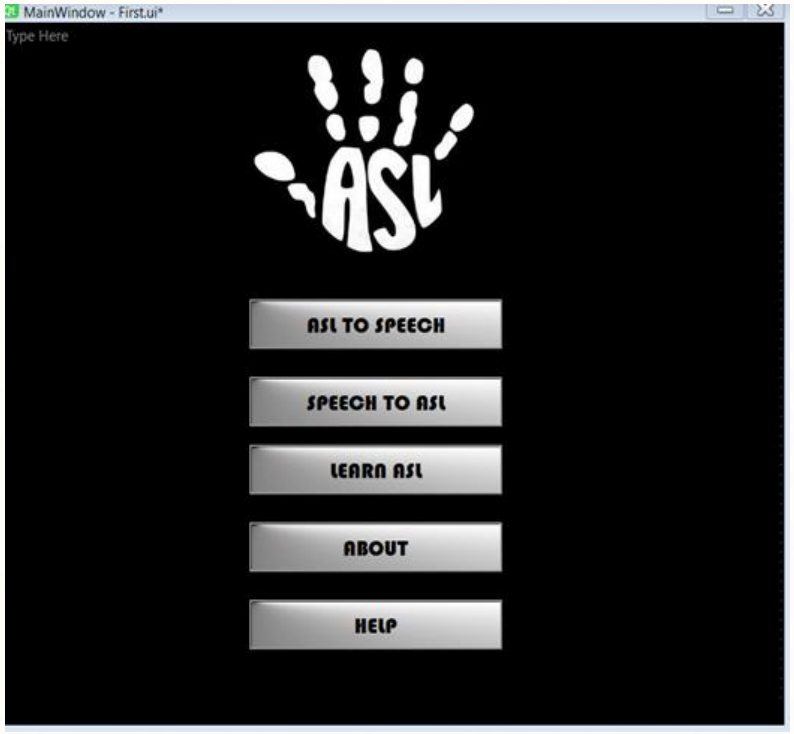
Sensor Data

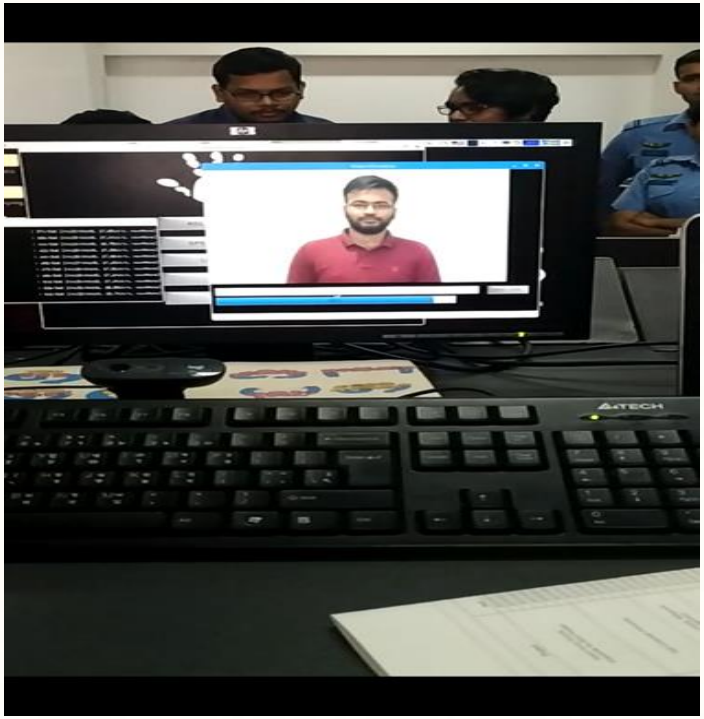
Flat	Usage(LTR)	Bill Amount(TK)
One	998.30	499.15
Two	0.00	0.00
Three	0.00	0.00

Flat One	Flat Two	Flat Three	Combined Total	Turbodity	Ph	Month	Week	Year
0.1	0	0	0.1	26.45	0.00	May	18	2019
0.1	0	0	0.1	26.59	0.09	May	18	2019
0.1	0	0	0.1	26.59	0.09	May	18	2019
0.1	0	0	0.1	26.31	0.00	May	18	2019
0.1	0	0	0.1	22.82	0.59	May	18	2019

Some Ongoing Projects

Sign Language Interpreting System
(Software & Hardware)





Some Finished Projects

- Canal Blockage Detection System
- Robotic Bomb Disposal System
- Alzheimer's Patients' Assistance System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Thank You