

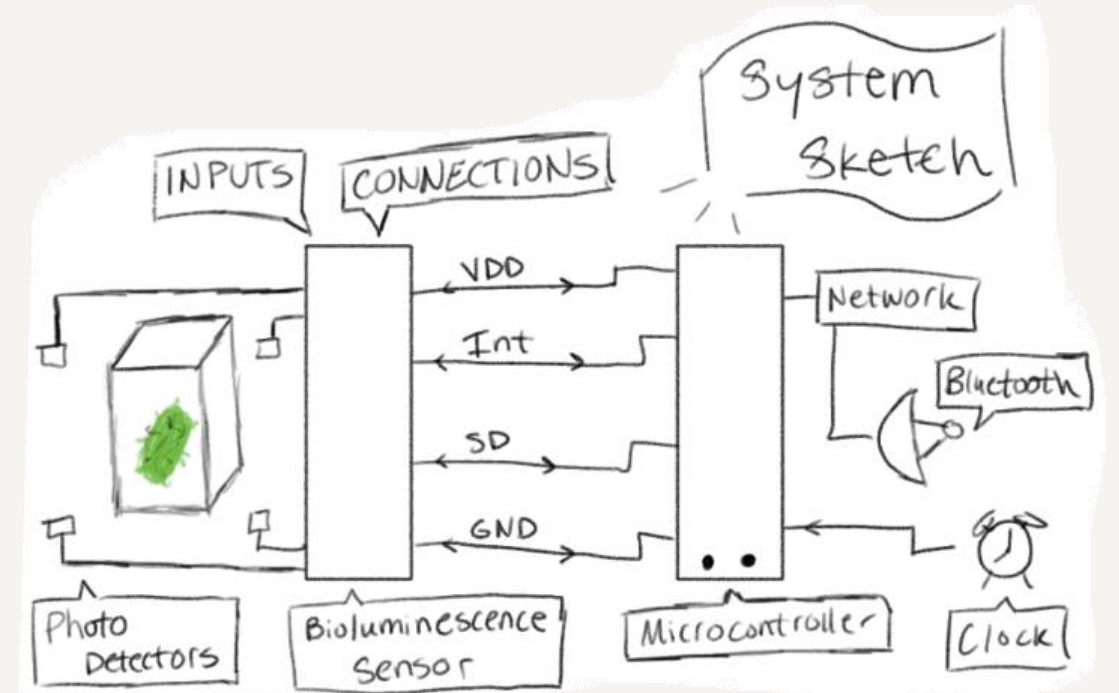
Problems & Users

SDMAY25-17

CADE KUENNEN, ALEX UPAH, WES RYLEY, RAKESH PENMETSА

Project Overview/Statement

- Develop an Electrical system that will house, monitor, and transmit data that is collected from a bio-engineered biosensor.
- Monitor and control the temperature of the housing unit to maintain cell growth.
- Create a circuit that will excite the biosensor with an LED, as well as a circuit to collect the emitted response.
- Transmit the collected data through a Low-Energy Bluetooth connection.



List/Description of Users

To start thinking and identifying users, we developed an empathy map and derived the following users/personas:

- Bioengineering Researchers:
 - Conducts research into new biosensor technologies and applications involving medical and environmental challenges
 - Develop new organisms for the detection of specific analytes
- Dr. Lu and Biomed Engineering Faculty:
 - Create new biosensors to accomplish goals
 - Search for new detection mechanisms to improve current biosensing technology
- Environmentalist/Ag Leaders:
 - Uses the engineered sensors to detect pathogens or pollutants in livestock, bodies of water, and other agricultural applications



User Needs

Have identified needs of

- Reliable detection of desired analyte
- Temperature control to keep internal biological detection component alive
- Ability to wirelessly transmit data via Bluetooth

Users	Needs	Constraints
<ul style="list-style-type: none">• Dr. Lu / Dr. Lu research Group• Biosensor engineers• Agriculture Monitoring Users• Researching Biologists	<ul style="list-style-type: none">• Small capsule sensor for sensing desired analyte using fluorescence sensor• Ability to wirelessly transmit data to external device via low power solution• Keep internal biological detection component alive	<ul style="list-style-type: none">• Small size and battery life• Managing the electrical detection system and data transmission• Short range data transmission from the field and replacing batteries or bacteria• Biological detection mechanism is via Green-Flourescent-Protien gene expression

All of these have been identified as required components for our solution to ensure it meets its desired function

Conclusion

- Developing a general temperature controlled microbial pill designed to detect specified analytes via fluorescence detection
- Biomedical engineers can design/engineer detection mechanisms and organisms suitable for our pill sensor solution
- Users in biomedical, environmental and agricultural detection are considered in design along with identified needs for the solution

Questions and Comments

