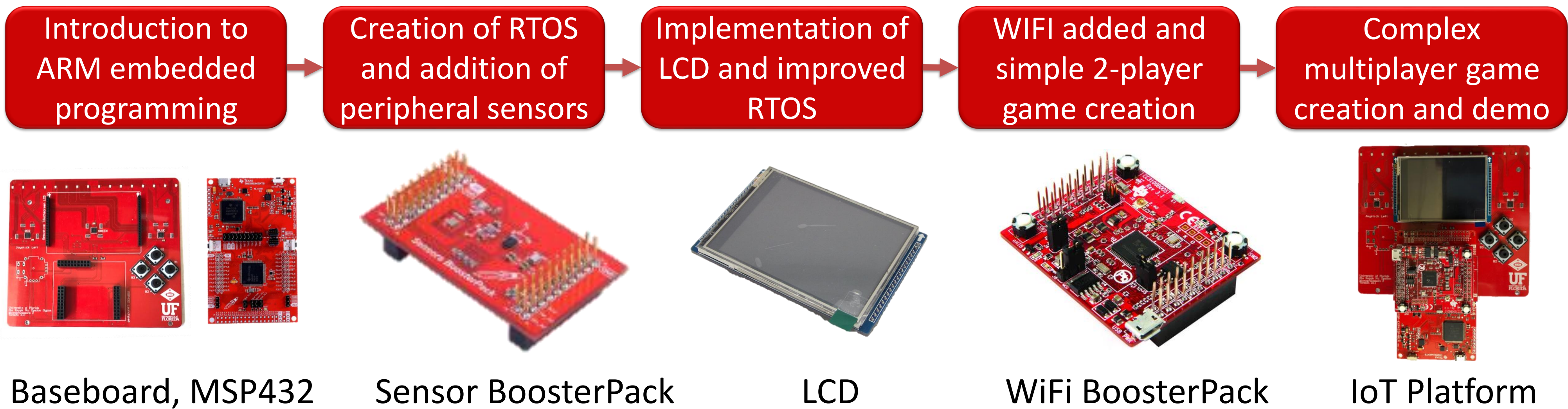# SaTC: EDU: Online Digital Forensics Courses and Labs for Students and Professionals (NSF-1802701)
- IoT Embedded Systems for Education (REU Poster)

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http://cyberforensic.net/project_demos.html

| Introduction to ARM embedded programming | → | Creation of RTOS and addition of peripheral sensors | → | Implementation of LCD and improved RTOS | → | WIFI added and simple 2-player game creation | → | Complex multiplayer game creation and demo |

Baseboard, MSP432 | Sensor BoosterPack | LCD | WiFi BoosterPack | IoT Platform

UF EEL 4930 - Microprocessor Application 2

- Pairs with an MSP432 development kit
- Baseboard has an LCD screen, joystick, 4 pushbuttons, and 16 RGB LED's that the user can program.
- The class implements creation of drivers and custom RTOS for game development.
- This board allows students to use an MSP432 with WIFI to implement complex systems such as multiplayer games through the use of the created RTOS.

## Utilization of TensorFlow Lite

- TensorFlow Lite has the ability to run on smaller ARM chips like the one we utilize in our lab and the class.
- Integrating test models allows testing of current hardware while also allowing further research in AI model creation.

Future Capabilities of the IoT Platform

- One priority is to improve the baseboard package allowing for more research and educational areas.
- Embedded Artificial Intelligence algorithm alongside a sound board will be integrated for speech pattern recognition.
- Adding embedded AI will help students gain a better background into AI and speech recognition.

| Test and Analysis of current hardware with sound board | → | Research algorithms in speech recognition and implement on board |

Speech → DNN → Speech Recognition

Broader Impact on Society

- Increase embedded system workforce
- Introduce AI into the embedded system domain
- Get more undergraduate students familiar with embedded system design
- Open-access educational website increases society IoT security awareness

Broader Impact on Education and Outreach

- Fill the gap on IoT design and hands-on practices
- Provide intriguing entry-level IoT design and security tutorials/labs for K-12 teachers and students
- Introduce the developed course to other universities
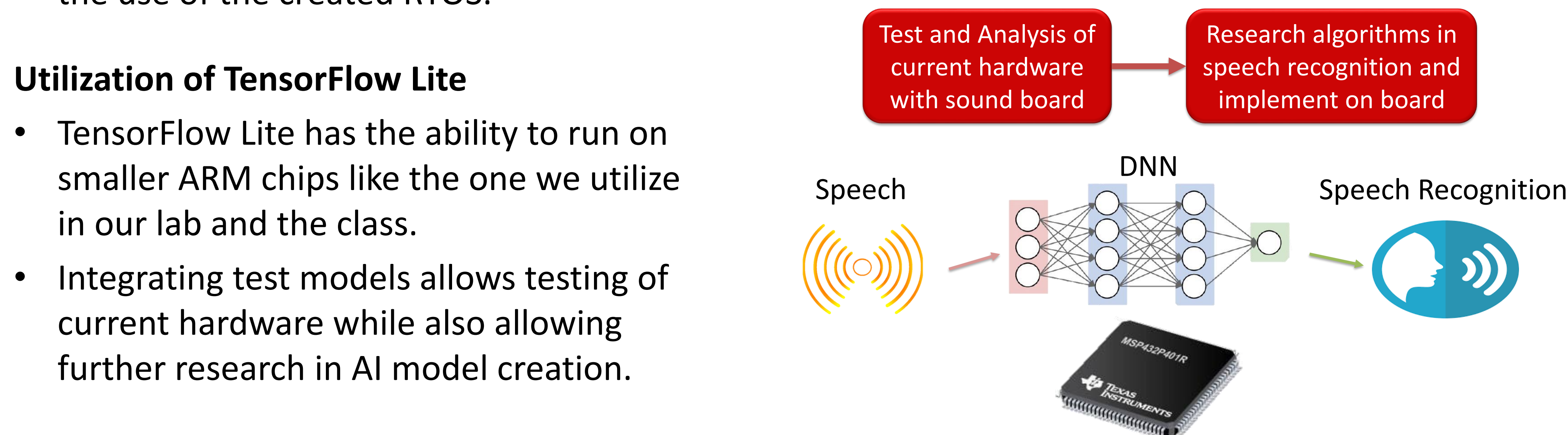
Quantify Potential Broader Impact

- Total student enrollment in the course: 80
- K-12 teachers and students visits: 3
- Universities adopting this course: 3