IOT - Kill Me Know or Pretty Cool!

This module has been a step into the unknown for me. It’s my first time using Arduino, coding, building circuits, I could go on, it’s a daunting prospect.

I’ve never been afraid to try new things, not true, I’ve often been afraid whilst trying new things but that addiction to knowledge, experience and excitement usually wins out in the end.

So l started with a 3-hour lecture on the basics or Arduino, coding and the types of sensors that can be used with it. I suspect most of those who attended the lesson left with a basic understanding of what was to come, I left thinking, ‘Kill me know’ I started seeing the Masters slipping away as a horrible realisation hit me. I’ve bitten off more than I can chew, everyone around me is a genius.

Jon and Martin, oh dear I thought. I could feel the trepidation building as it was explained just what we were expected to achieve with these guys. Were they insane? Did they think I was someone else? How could I explain to them what a huge mistake I’d made?

I wondered if I should put my hand up and ask to be excused there and then.

I came to this project late having booked a holiday earlier in the year before I knew I would be studying on the Product Design course. I managed to miss a couple of important days during the first week of the module and most of the second week. I returned to college on Friday, week two, everyone was busying around with soldered circuits or developing code for their new product ideas. They all seemed to have a grasp on the module and were developing lots of new smart devices, no-one seemed stressed at all, or so it seemed.

There can be so much fog at the beginning of a new module or project, gaining confidence can be slow. The tasks you are often face with seem almost impossible, how will you ever manage to learn it all?

Turns out, you don’t need to learn it all! That’s a relief.

Just one bit at a time. Most of the problems you’ll face with coding and circuit building have been solved by previous users who supply code and circuit images on many open source platforms. Thank you Open Source!

My first task was to come up with lots of ideas for products related to the connected home and the Internet of things. I spent one morning just sitting considering different problems I face within my own home and the difficulties communicating with the children at times. By lunchtime I had around 20 ideas for consideration. Slowly the fog was beginning to lift and I was starting to feel like I had a grasp on the things.

IOT IDEAS

1. A sensor on a washing line detects rain and signals the user (Sight Impaired)

The sensor sends a message to their mobile phone advising them to take in their laundry.

1. A button in the kitchen that disables the internet in their children’s bedrooms at meal times/bedtime.
2. A sensor on the washing machine that checks the local weather and reports back if it it’s wise to hang washing at that time
3. Sock on the door. A light system for the outside of the bedroom or office door that can be switched to red or green to allow others within the flat, home or office whether they can be disturbed or not. Red = Busy, Green = Enter.
4. A sensor that helps one sock locate its partner.
5. A light sensor for a child’s room that will increase the light in a bedroom as it gets darker.
6. A schoolbag that reminds you when you need to pack your games kit etc.
7. Scan your clothes and have the computer show you which colours and outfits will look best together.
8. Kettle that fills automatically from the mains supply. The base is connected to water, filling through the underside. Kettle detaches for pouring.
9. A mug that lets you know when it’s almost full, for coffee machines that don’t shut off automatically.
10. A sensor detects when drawers or wardrobes are opened and sends a signal to relatives or carer that the person is up and about
11. A dressing mirror that detects unusual marks or growth patterns.
12. Everything powered by transparent solar panel windows in all traditional window positions.
13. Oven timer/Microwave/Door-bell alert to your mobile.
14. A camera by the door-bell that will start to recognise faces and alert your mobile with a door ‘caller ID’
15. Delivery App, Communicate with delivery people at your door remotely. Sign for things remotely.
16. A fridge reader that can tell you when you have food that needs to be used soon.
17. Thermostat that measures the outdoor temperature and adjusts the indoor temperature appropriately.
18. Detect the electricity consumption of a single room/bedroom/kitchen etc
19. Bathroom alert, Get a signal to your mobile phone when it’s free.

NARROWING IT DOWN

By the end of the day I had narrowed down my list to just one idea, a child’s school bag that would remind them to take their homework, gym kit or packed lunch with them to school. I created a persona and started on my research. I didn’t feel there was enough time to go through the Co-Design process properly or try out too many tools, this was most likely down to missing a week.

WHAT IS ‘THE INTERNET of THINGS’?

The Internet of things or IOT is not new pundits and technology companies have been debating the idea for decades and the world’s first internet toaster was revealed at conference in 1989.

At its core, the Internet of things is simple, it’s all about connecting devices to the world wide web, allowing them to communicate with the user and one another.

A popular example is the smart fridge: What if your fridge told you it was out of eggs, messaging you when it’s internal sensors detect no eggs or that the eggs that are currently in your fridge have passed their sell by date. The IOT is most commonly used within the energy and home heating – partly because the UK government has pushed energy companies to design smart metering systems. These have intelligent functions that allow heat to be turned on remotely, turn down the temperature if it’s a sunny day or turn off when no one is home. Some can tell the later with cameras that sense motion, or simply by seeing that your smartphone (therefore you) has left the premises.

The internet of things is much more than just smart homes with connected appliances, however. It scales right up to include ‘Smart-Cities’- think connected traffic lights which monitor utility use, smart bins that signal when they’re full and require to be emptied and industry, with a network of sensors for everything from monitoring crops to tracking parts.

Why does all this matter? There’s a very good reason the government is pushing energy companies to install smart meters: all the data and automated use is more efficient, this means we use less energy. Many areas of the internet of things show such benefits, although some IOT (smart gadgets) are more about whizz-bang effects than efficiency, which is why we are now seeing far more smart fridges and heating systems in the UK.

‘JODIE’ PERSONA

Jodie is an eleven-year-old girl from Wormit, Fife.

She takes the bus to her high school, Madras College, St Andrews at 8:05 every weekday morning. Jodie has a brother called Saul who is one year older and also attends the same school. He also has to leave the house around 8:00 to get his bus for school.

Jodie’s parents Jon and Zanna leave for work at 8:00. Mornings can be busy and stressful for Jodie’s parents. A little help reminding the kids to pack their school bags properly would be a great help to them and avoid even more stressful situations later in the morning as left behind items are discovered missing.

When Jodie was in primary school, her dad Jon received many phone calls from the school or Jodie requesting dad bring something to school that she had forgotten. Nine times out of ten the missing items were homework or gym kit. What can be done to improve the atmosphere and general stress levels in the Christie home at this very busy time of day for them?

RESEARCH

I found one research paper on the subject of ‘reminder school bags/products’ by Lei Jing, Zixue Cheng, Mizuo Kansen, Tongjun Haung and Shengguo Sun, entitled ‘An Educational Schoolbag System for Providing an Object Reminder Service’. In summary the paper discusses how we might add a reminder service to a schoolbag. Educational function would be added to the device to help pupils remember belongings. Reminding oneself of things is a difficult task and reminder services have been an important subject of computer applications. However, most reminding tools are used for business not education most services use PDAs as terminals and require the user to create the reminder list by him or herself, making it too complex for some pupils to use. The systems also seldom pay attention to helping users learn how to avoid forgetting. In this research, a ubiquitous learning support system that makes use of schoolbags is presented to assist pupils in managing their personal items. With RFID and infrared sensors, a microcontroller embedded in a schoolbag can monitor what has been put in or taken out of the schoolbag and automatically maintain a school bags item list. Such a bag also enables teachers to make a schedule that specifies required items for given days. The microcontroller then compares the schedule with the items list in the schoolbag and provides a reminder service for the pupil. In addition to the reminder service, which is based on principles of behaviour modification, the paper also proposes a series of methods to help pupils for good personal management habits and reduce the dependence on outside machines. One other important thing I took from the paper was that this type of system would be of great benefit to children with learning difficulties. This was a basic summary of the paper.

Clever Monkey

This is a product designed for the whole family. The Clever Monkey makes sure the kids have their homework, their gym kit and packed lunch. This beautiful little device can make a real difference on those busy mornings. Make sure your loved ones always go off to school well prepared. Let’s face it parents forget things too. Made in Scotland from the finest black walnut and featuring a brushed copper clasp. There are 5 wonderful creature characters within the collection that truly bring the wood to life.

HOW IT WORKS

At first I considered making the whole bag as the product but soon realised making the whole bag was unnecessary and I could open up a larger market if the product simply attached to existing bags.

The Clever Monkey comes in 3 parts. Smart phone app, Tilt switch unit and the Clever Monkey itself. The App is used to program in your child’s weekly timetable, to input the users name and set the timer. The small tilt switch unit is placed within the child’s bag and can sense when the bag is picked up in the morning and send a signal to the Clever Monkey to give its reminders. The monkey will be programmed to work once a day only and can be set to a timer or a half hour time slot in which the bag will operate once if picked up.

This idea could be changed slightly for different age groups, working roles and leisure.

GOT MY IDEA

My first big task was to design a character for my product that would be pleasing to children. After a fair amount of sketching and cad work I came up with clever monkey a small wooden disc –shaped product that would attach to the strap of the child’s school bag. After drawing up the character in Rhino I went ahead and made my first 3-D print. Although the 3-D print was successful and could easily be used for the prototype my personal design process forbids me from using plastics within my designs if better natural materials can be found. My intention is now to use the three axis milling machine in the Make Lab to turn my little monkey in wood. Thus providing a higher quality product with minimal environmental drawbacks.

Building the circuit

This I found particularly tricky and had to seek out help from classmates and staff, however once I had it soldered up and working I was able to look and understand more easily what was happening within the circuit and why.

Final prototype

This is always the best part for me, the solid 3D representation of my product. The excitement really kicked in for me when it came time to put it all together, to see how I can inject some of own design principles. My first scale prototype was drawn on Rhino and then 3D printed. The final version is to be 3 axis milled from American black walnut. There appears to be quite a que for the milling machine which is quite small, slow and serves the entire university. This is surely an area that requires some additional resources.

Writing the code

The most frightening part for me. It’s difficult to remember all of the different commands required to write it. Thankfully the majority of the code that I required was available to download and then just required ‘tweaking’. I’m not sure that’s the word I’d use but between myself Shaun, Martin and Ali we got it all running and I gained some understanding of the basics and could approach a future project of this nature with far greater confidence.

Making the video

I intend to do a short advert/mock-up of my product using my daughter as the forgetful schoolgirl who needs constant reminders. This will hopefully give a clear overview of ‘Clever Monkey’ and its intention.

Conclusion

Pretty Cool! We got there and fast, it was very impressive looking at everyone’s new smart ideas, their little babies you might say the way they’ve been carrying them around over the past week. There is always someone more competent than you that can help when problems arise and so much information on ‘how to’ already out there. I’m beginning to understand the process involved in embedding communication technology into our daily lives and I believe that was the point of the module. Not to turn us into engineers, coders or tech wizards but to at least understand a little of what they do and what is available to us as designers.