UNMC's Electric Vehicle (EV) - *ekancil*

A research on improving electric vehicle battery lifetime

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"The United States of America cannot afford to bet our long-term prosperity and security on a resource that will eventually run out."
-US President Barack Obama.

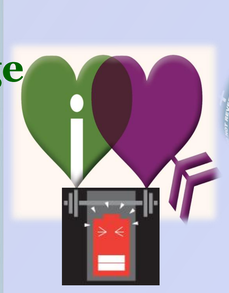
"Building cars powered by alternative fuels but still using oil is unsustainable. I want a pure electric car, not a range extend or another hybrid. Its not going to be zero emissions in certain conditions **. Its going to be ZERO emissions"** *– Carlso Ghosn Nissan & Renault CEO*

EV BATTERIES NEED TO GET BETTER

- **Electric cars are the future -- a view shared by government and the automotive industry alike.**
- **Low range, slow charging rate, high cost of batteries which have limited lifetime are all major factors which have prevented the EV from going mainstream.**
- **Surveys show that 75% of people would buy an electric car if they did not have to compromise in terms of cost, comfort and safety.**
- **Hence the onus is on battery manufacturers to come up with a battery which will overcome these constraints.**
- **Alternatively, a hybrid battery may be the solution. Combining different types of batteries with proven strengths and weaknesses in such a way that they complement each other.**

BATTERY MEETS ULTRACAPACITOR

- **Batteries are slow but reliable**
- **Slow charge-up** (4~8 hours)
- **Average discharge** (not suitable for sudden acceleration)
- **Limited lifecycle** (will eventually die out)



- **Ultracaps are fast but don't last long**
- **Very fast charge-up** (10~ 30 minutes!)
- **dispense their charge speedily** (curing the slow acceleration problem that plagues most electric cars).
- **Virtually unlimited lifecycle**

Combine these two devices and you potentially have an EV that charges up in minutes, longer lasting batteries and superb braking energy recovery; The "ultrabattery".

MEET UNMC's *ekancil*

Perodua Kancil ; Malaysia's most famous compact car

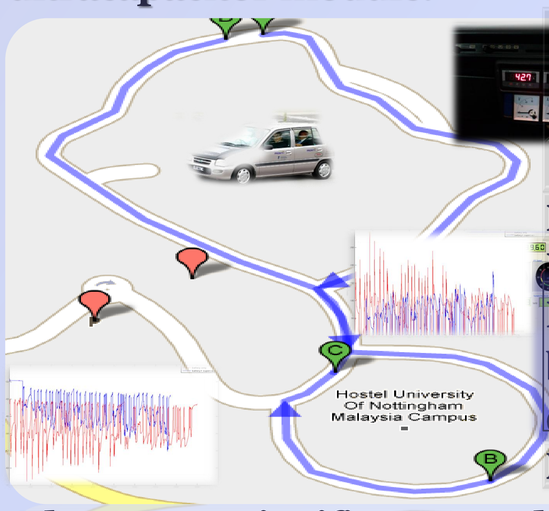
Engine replaced with electric motor, petrol with batteries

All wired up. Ultracapacitor installed

Electric Perodua Kancil

RESULTS (ULTRACAP + BATTERIES IN *ekancil*)

The ekancil was driven on a fixed route on campus and data was collected for each case; with, and without turning on the ultracapacitor module.



	Battery Only	UltraBattery	
		Delivered by battery	Delivered by Ultracap
Peak current	294A	180A	200.9A
Peak Power	11306W	7680W	8786W
Highest recorded battery voltage drop	10V (48V→38.44V)	6V (48V→42V)	N/A
Maximum Speed	36.5 Kph	40kph	

Tun Dr. Mahathir Mohammed (ex-Prime Minister of Malaysia), driving the ekancil. 11/1/2011

The most significant result was the recorded battery voltage drop. This means that with the help of the ultracapacitor, the battery is less stressed! A less stressed battery means a longer lasting battery. Presently, only 20% of the ultracap is being used, our research aims at utilizing 90% of the ultracap to assist the battery pack.

HUGE POTENTIAL

A perfectly matched hybrid between batteries and ultracapacitors would enable electric cars to charge in minutes , accelerate with a lot of "oomph" and regain energy from braking with ease.