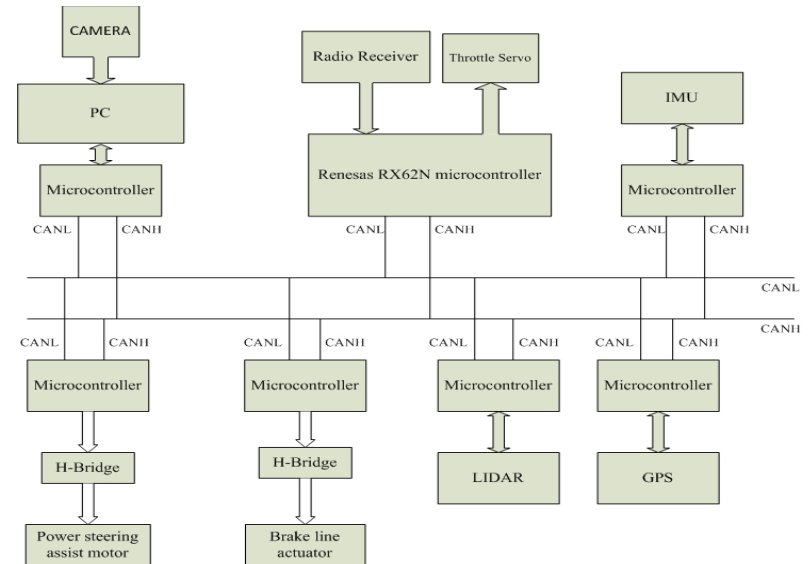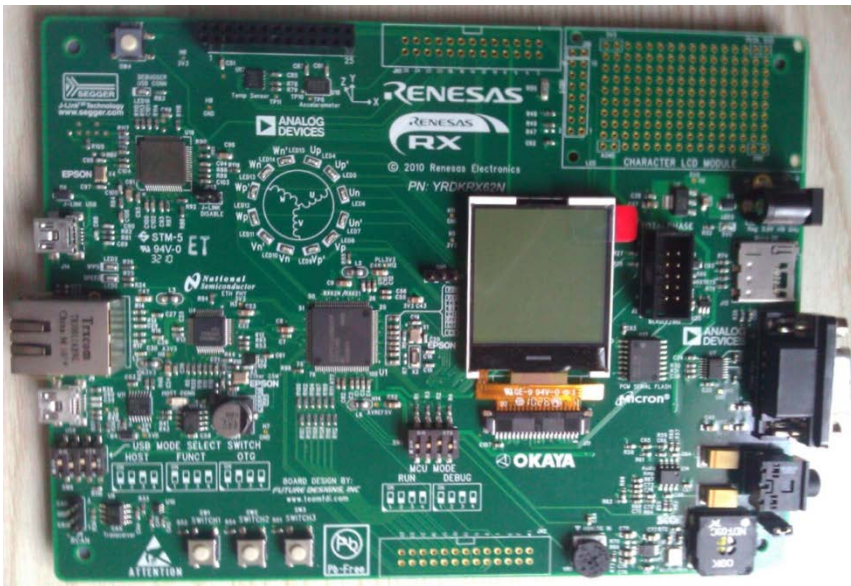# *Ethics in Research and the Profession*

So what exactly is ethics in research?

Turn to your neighbor and identify three bullet points of ethics in research and the profession:

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So what exactly is ethics in research?

Turn to your neighbor and identify three bullet points of ethics in research and the profession:

- No plagiarism (don't copy someone's writing)
- Do research in a timely manner
- Properly cite others work
- Properly acknowledge/list everyone's contribution
- Do not falsify data/results
- Report any corrections to papers/data/results
- Work methodically
- Be cognizant of proprietary information
- Do not take credit for someone else's work
-

Case study: Is this a good paper?

Implementation of CAN Bus in an Autonomous All-Terrain Vehicle

T. Swathi[1], S. Koteshwara Rao[2]

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Abstract: The main purpose of this effort is to design an autonomous all terrain vehicle which uses a CAN bus. The paper describes the operation and advantages of the CAN protocol in automobiles. The ATV used for this design is a Honda Four Trax Rancher AT and a brief explanation of the parts in the ATV is provided. The Renesas RX62N microcontroller is used as a CAN controller which creates a single two wire bus through which electronic control units (ECU) in the automobiles communicate. The working of the CAN protocol on the RX62N has been explained with the help of pseudo code.

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The ATV selected for this project was a Honda Four Trax Rancher AT, which is also known as the TRX420FPE/EPS. It has a 420cc gasoline engine, an electric power steering assist system, and an electric transmission shift system. The power assist steering system is comprised of a torque sensor and an electric motor attached to the steering column. Additionally,

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They look the same!

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Keywords: Electronic Control Units (ECU), CAN, ATV, Microcontroller.

I. INTRODUCTION

The recent technology trends in the automobile industry are bringing more comfort in a vehicle by incorporating automation techniques like collision avoidance (which uses lasers to detect the objects around the vehicle and when the vehicle gets closer to any object, the brakes will be applied automatically), advanced safety features, entertainment devices and lot more. As the technology is developing, the use of electronic control units (ECU) in vehicles is increasing rapidly, making the communication between them very com-plex. Multiplexed communication was eventually developed to decrease the interconnections (cables) and the complexity between the ECUs. But the multiplexed communication has not met the real time communication requirements. In 1980s, BOSCH, a technology based corporation designed a multi master serial communication protocol called Controller Area Network (CAN) which is robust, real time and also reduces the amount of cables to be used for the interconnections. The CAN protocol is an asynchronous serial communi-cation protocol which follows ISO 11898 standards and is widely accepted in automobiles due to its real time performance, reliability and compatibility with wide range of devices. The CAN protocol is a two wire, half duplex system which has data rates up to 1Mbps and offers a very high level of security. Its ease of use, robust, low cost and versatile technology made it applicable in other areas of applications where inter processor communication or elimination of excessive wiring is needed. Some of the areas it is widely used are industrial machinery, avionics, medical equipments, building automation etc.

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B. Renesas RX62N Microcontroller

The Renesas RX62N group has a RX family/RX600 series 32-bit CPU which features high performance and high speed. The RX62N group is equipped with two channels of USB 2.0, one channel of ethernet, one channel of CAN bus protocol, timers, independent watchdog timer and brown out detectors (power on reset and low level voltage detection).

Fig. 1. Renesas RX62N miroucontroller.

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Fig. 1. Renesas RX62N mircontroller

The CAN module on RX62N group implements one channel of CAN bus protocol according to the specification of ISO 11898-1. This allows communication of messages in both,

But who copied who?

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Hmmm, it looks like the IEEE paper came first.

The WILLIAM STATES LEE COLLEGE of ENGINEERING
UNC CHARLOTTE

Based on your bullet points, what is wrong?

Discussion:

So, what is the ethical violation of this action?

What happened:

- A researcher submitted a paper to the journal.

- They did not do the work.

- They did not write any words

- They are representing this work as their own.

- They lied to the publisher that this work was theirs, and they owned the writing.

- The publisher violated copyright law by copyrighting and publishing a paper that was ALREADY copyrighted and published

- The student likely received credit for a project class for their plagiarism – so they really did not do the work needed to earn a degree.

Should they have known better?

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WHOA!

A post-graduate student and

A HEAD OF DEPARTMENT!!!!!!!!

What do you think?

So, put yourself in the shoes of the authors:

- How would you feel if someone took credit for YOUR work?

- Who else has been "wronged" by this violation?

Well, since I own one of these ATVs . . .

Implementation of CAN bus in an autonomous All-Terrain Vehicle

Sunil Kumar Gurram and James M. Conrad

Electrical and Computer Engineering Department, University of North Carolina at Charlotte, NC, USA

E-mails: {sgurram, jmconrad}@uncc.edu

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Who has been hurt by this incident?

It is obvious that the authors of the first paper have been hurt by someone claiming credit for their work. Anyone else?

- IEEE – their brand has been compromised by two identical papers being copyrighted by another publisher.

- The unethical authors – they "got away" with this plagiarism, and are encouraged to do it again (are you the next victim?).

- The Indian publisher – the authors put them in an illegal position.

- The authors of legitimate papers with this Indian publisher may see the value of their papers decrease when word of this incident is well known.

- The Indian Institute, when people learn that they have faculty who support this unethical behavior.

This is an extreme example . . .

- Plagiarism is the use of another's published OR UNPUBLISHED work and representing it as your own.
- Theft is taking something that belongs to another (usually the injured party no longer has the item that was taken).

Is plagiarism also theft?

What about publishing someone else's work and representing it as your own?

- Student does work (with or with professor's help), professor publishes a paper on the work without the student's name on paper.
- Student and professor work together, student publishes paper about the work without including professor.

Ethics and an engineers obligation to society

An engineer's first obligation is always to society. This obligation takes precedence over all others (including self and company).

- Be a guardian of safety and welfare of the public.
- Submit truthful and complete reports, statements, and testimonies.
- Do not abuse or violate the public trust.
- Inform state boards of possible ethics violations.

IEEE Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the **highest ethical and professional conduct** and agree:

1. to accept responsibility in making engineering decisions consistent with the safety, health and welfare of the public, and to disclose promptly factors that might endanger the public or the environment; **("whistle-blowing")**

2. to avoid real or perceived **conflicts of interest** whenever possible, and to disclose them to affected parties when they do exist;

Excerpts from IBM's Code of Ethics

- No employee, or any member of his or her family, can accept gratuities or gifts of money from a supplier, customer, or anyone in a business relationship. Nor can they accept a gift or a consideration that could be perceived as having been offered because of the business relationship. "Perceived" simply means this: If you read about it in your local newspaper, would you wonder whether the gift just might have something to do with a business relationship?

- No employee can give money or a gift of significant value to a supplier if it could reasonably be viewed as being done to gain a business advantage.

Excerpts from TI's Code of Ethics

- It is TI policy that TIers may not give or accept any gift that might appear to improperly influence a business relationship or decision.

- If we receive any substantial gift or favor, it must be returned and our supervisor notified.

- This policy does not apply to items of small value commonly exchanged in business relationships.

- Excessive entertainment of any sort is not acceptable. Conferences accompanied by a meal with suppliers or customers are often necessary and desirable. Whenever appropriate, these meals should be on a reciprocal basis.

The TI Ethics Quick Test

- Is the action legal?
- Does it comply with TI's values?
- If you do it, will you feel bad?
- How will it look in the newspaper?
- If you know it's wrong, don't do it!
- If you're not sure, ask.
- Keep asking until you get an answer.

From http://www.ti.com/corp/docs/company/citizen/ethics/quicktest.shtml

Hypothetical Example – Bribery ("Gifts")

Suppose you are a design engineer and are responsible for selecting the supplier of an expensive, high volume component. You are visited by a sales engineer who:

1. Gives you a ball point pen and a baseball cap.
2. Offers to take you out to lunch at a very nice (and expensive) restaurant.
3. Offers to take you to a *<major sports league>* game that weekend.
4. Offers to include an all-expenses paid developer's training class in Hawaii if you purchase from him/her.
5. Offers to send you on an all-expenses paid vacation for two in Barbados if you purchase from him/her.

How should you respond to each of these offers?

Actual Examples – Bribery ("Gifts")

Offers to a project engineer responsible for specifying and selecting capital equipment (approx. $1M)

- One vendor offered a trip anywhere in the world for an "acceptance test"
- Another vendor offered satisfaction of any vice (gambling, women, drink, etc.)
- Travel included with system
- Various gifts of food and drink

For every gift, consider the ethical implications!

Examples – Making Estimates

- Software engineer estimating time required to complete a project

- Sales engineer estimating specifications of a new product to potential customers

- Design engineer estimating cost to develop a new product

It is unethical to deliberately provide a biased estimate!

Example – Conflict of Interest

- Software engineer contracted with his employer's customer "on the side" for a piece of software
- Charged less than his employer would have for the same work
- Amount of money was small (<$2,000)
- Ramifications were felt for 5-10 years
- Many employers have a blanket restriction on "moonlighting" of any kind

Why Behave Ethically?

- It works – a capitalistic economy is based upon competition in an open and free market. Bribery and other unethical forms of behavior corrupt the free-market mechanism.

- Your professional reputation depends upon it.

- Your behavior reflects upon your employer, co-workers, university, race, sex, nationality, and the entire engineering profession.

- It's morally the right thing to do.

- It's what is expected of you as a professional.

How to Maintain High Ethical Standards

Practice making ethical decisions starting NOW
- Frequent small decisions that are ethical lead to ethical habits which build an ethical character
- While in school, follow the student code of conduct. If in doubt, ask the professor

Associate with ethical people
- Ask about a company's code of ethics when interviewing
- Look for a new job (or quit on the spot) if your company engages in unethical practices

Ethics Situation #1

While working for your company, you invent a device that has a potential for making you wealthy. You used the company's lab and test facilities, but did the work on your own time. What do you do with your invention?

Some options:
1. Take it to the company's legal department for determination of ownership rights and appropriate disposition.
2. See a local attorney and have him file for a patent in your name
3. Submit your invention for consideration in your company's "ideas count" program.
4. Contact those companies who would have an interest in your invention and sell it to the highest bidder.

Ethics Situation #2

A company-sponsored training course in your field is being held in Orlando, Florida. You have no interest in the training, but you are ready for a vacation and have never been to Disney World. What do you do?

Some options:
1. Even though you have no interest in the training, ask your supervisor if he thinks it will benefit you.
2. Obviously, or maybe not so obviously, it will be of some benefit to you, so sign up.
3. Reluctantly decline to go.
4. Suggest someone else to go who has both a need and the interest.

For several months now, one of your colleagues has been slacking off, and you are getting stuck doing the work. You think it is unfair. What do you do?

Some options:

1. Recognize this as an opportunity for you to demonstrate how capable you are.

2. Go to your supervisor and complain about this unfair workload.

3. Discuss the problem with your colleague in an attempt to solve the problem without involving others.

4. Discuss the problem with the human resources department.

Contact Information

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