A

Final year project presentation on "Touchscreen Based Electronic Voting machine using ARM"

Supervised By: Er. Dinesh Baniya Kshatri

Internal Examiner: Assoc. Prof. Dr. Surendra Shrestha

External Examiner: Shree Bhadra Wagle(Director, Radio Nepal)

Project Members

Binod Raj Pandey(067/bex/412)

Dipendra Kumar Limbu(067/bex/417)

Prakash Gaire(067/bex/426)

Tej Prasad Adhikari(067/bex/445)

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Motivation

- Election is an integral part of democratic system
- Current paper based ballot voting system has many flaws
- Such flaws can be corrected using electronic voting system
- Electronic systems are becoming popular in every aspect of modern society

Objective

- Adopt modern technology
- Take into account essential voting requirements in terms of privacy, uniqueness, completeness, efficiency and fairness
- Eliminate bogus voting and vote repetition
- Reduce election expenditure in the long run
- Offer more transparency and faster voting results

Scope

- Can be implemented in:
  - Small scale elections
  - Opinion polls during annual share holder's meetings
  - General assembly elections

Related Works

Technology Sales Pvt. Ltd. situated at Lainchaur, Kathmandu has also released a similar type of voting machine in the name of "Nepali Voting Machine"

Advantages of our project:

- use of ARM microcontroller enables cost reduction
- password based authentication used for both administrators and voters increases reliability
- use of touchscreen enables size reduction and portability
- implementation of software controller for easier modification and more flexibility
- cheaper($200 vs. $1000)
- lower power consumption

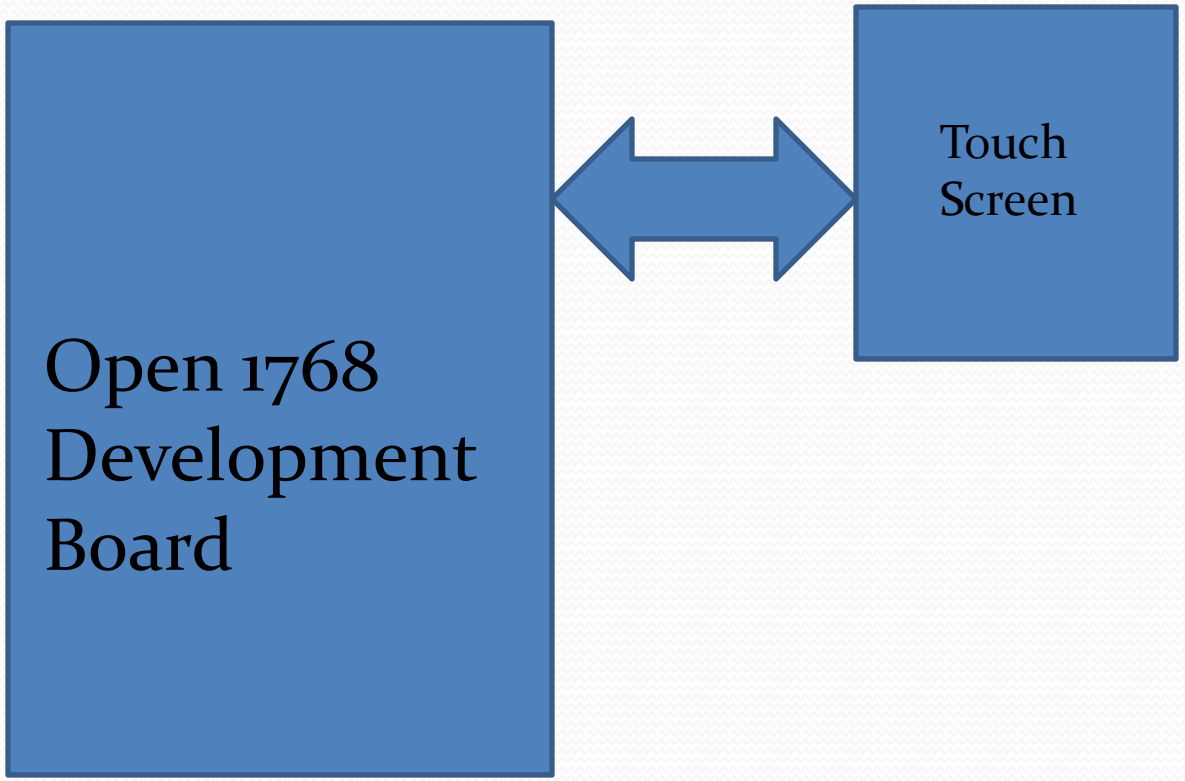
Introduction

- Reflection of advanced technology and changing demand of society
- Demonstration of a better voting system compared to traditional voting system
- Interfacing of touch screen for voting
- Elimination of bogus voting and vote repetitions

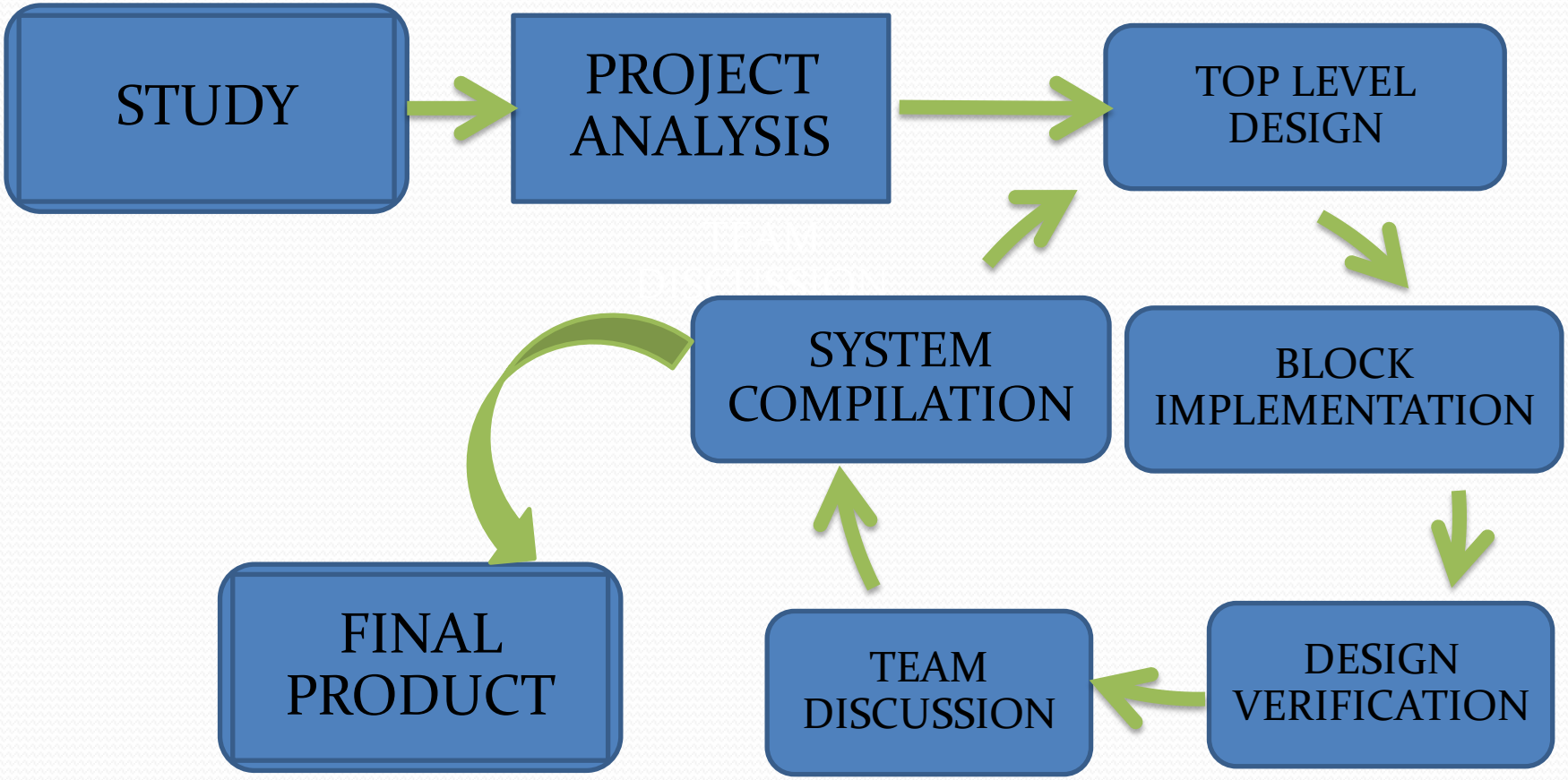
Statement of Purpose

- Reducing rigging in elections
- Decreasing probability of vote disqualification
- Eliminating bogus voting and vote repetition
- Offering an economical voting solution in the long run
- Delivering faster voting results
- Constructing a portable system
- Lessening reliance on manpower

System Block Diagram



Methodology



Major Tools

- C Programming language to build software
- Keil microvision5 to build target
- Flash Magic to burn the software into ARM micro-controller

Comparison between Microcontrollers

	ARM	PIC	AVR(8bit mega)	8051
Processing Speed	Faster processing sped	Comparatively slower processing speed	Comparatively slower processing speed	Comparatively slower processing speed
Operating frequency	OPERATING clock FREQUENCY 1GHZ OR MORE	AT MOST 50 MHZ CLOCK SPEED	Internal operating frequency 4.8-9.6 MHz	crystal oscillator frequency is 11.0592 MHz
Flash Memory	Up to 512 kB on-chip flash programming memory	3-128 KB	Flash memory up to 256 kb	4-8 KB MEMORY
Configuration	INBUILT CPU,ETHERNET	Inbuilt Ethernet absent	Inbuilt Ethernet absent	Inbuilt Ethernet absent
RAM	32/16 kB of SRAM on the CPU with local code/data bus for high-performance CPU Access.	4-128 KB RAM	32KB RAM	128-256 KB RAM
Architecture	RISC	RISC	RISC	CISC
Power Consumption	least	Relatively higher	Relatively higher	Relatively higher

Power Consumption

- ARM micro-controller: 1.5 Watts, 5 V
- Touch-screen : 0.8 Watt, 3 V

  Total: 2.3 Watt, 5 V

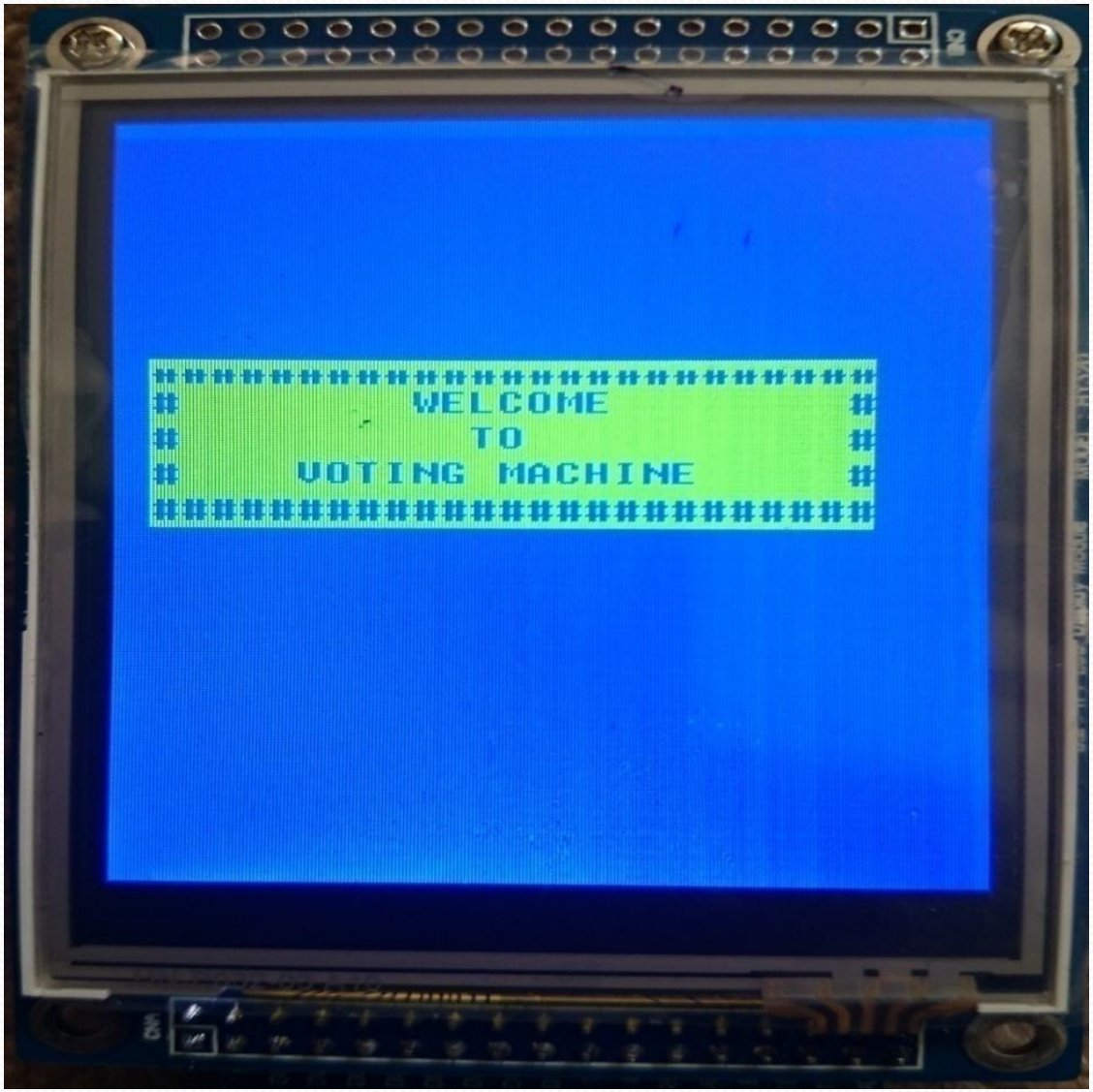
A simple mobile charger or USB port of laptop can provide the required power to the device.

Result –[1]

- Touch screen initialization

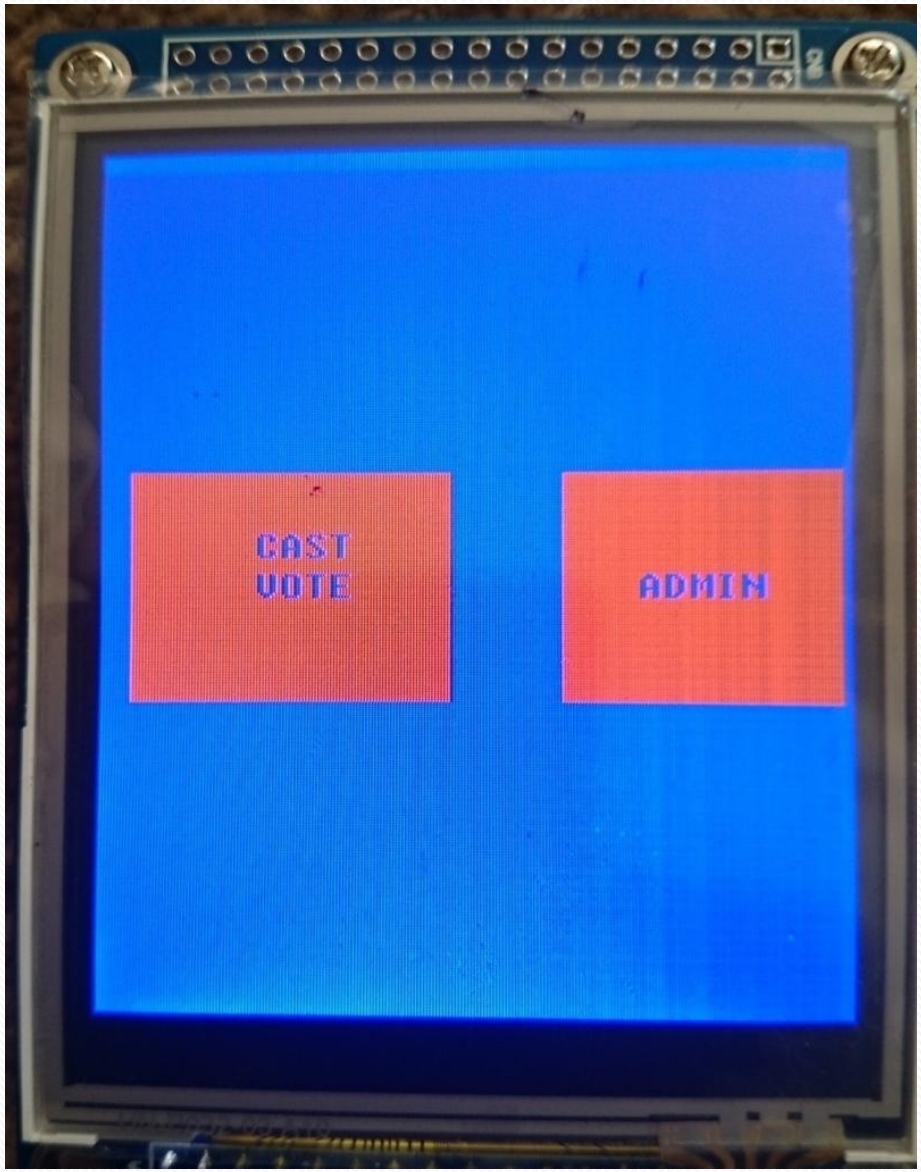
Result –[2]

- Users are welcomed



Result –[3]

- User Types
  - Voters
  - Admin

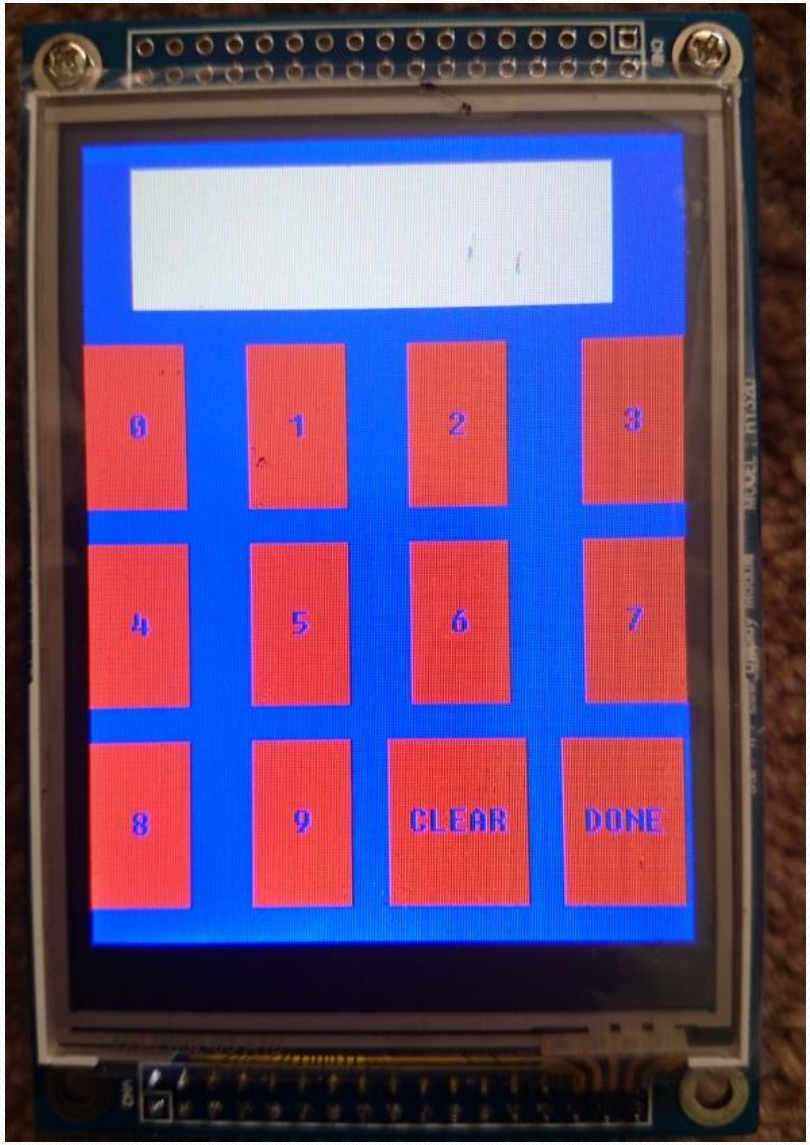


Result –[4]

- Instruction screen displayed to voters

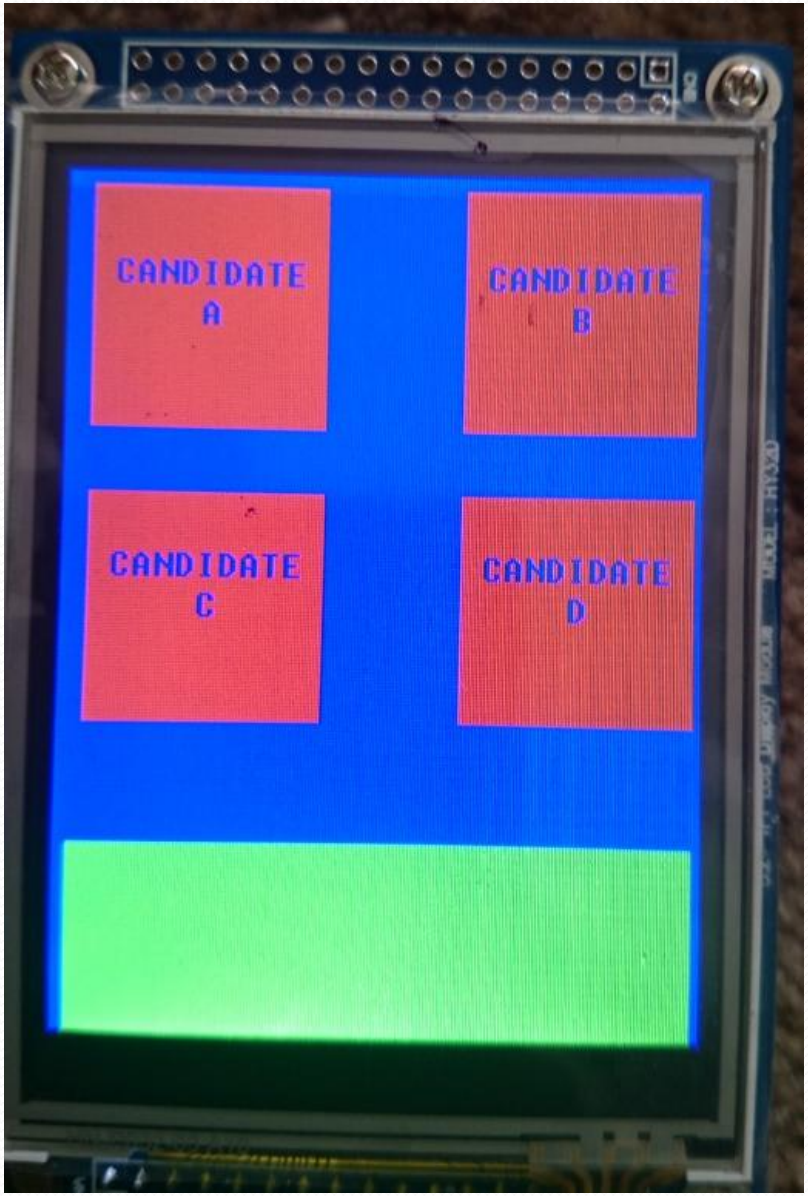
Result –[5]

- Authentication screen displayed to voters



Result –[6]

- Candidate selection screen displayed to voters



Result –[7]

- Screen displaying a successful voting outcome

Result –[8]

- Screen displaying an error message if same voter tries to recast his/her vote

Cost Estimation

DEVICE	COST (NRs.)
ARM microcontroller	10,000
Touch screen	7,000
Stationery	2,000
Miscellaneous	5,000
Total	24,000

Future Enhancements

- Incorporating better version of ARM
- Using encryption to secure data
- Interfacing printer to machine
- Connecting with personal computer
- Employing fingerprint module for authentication

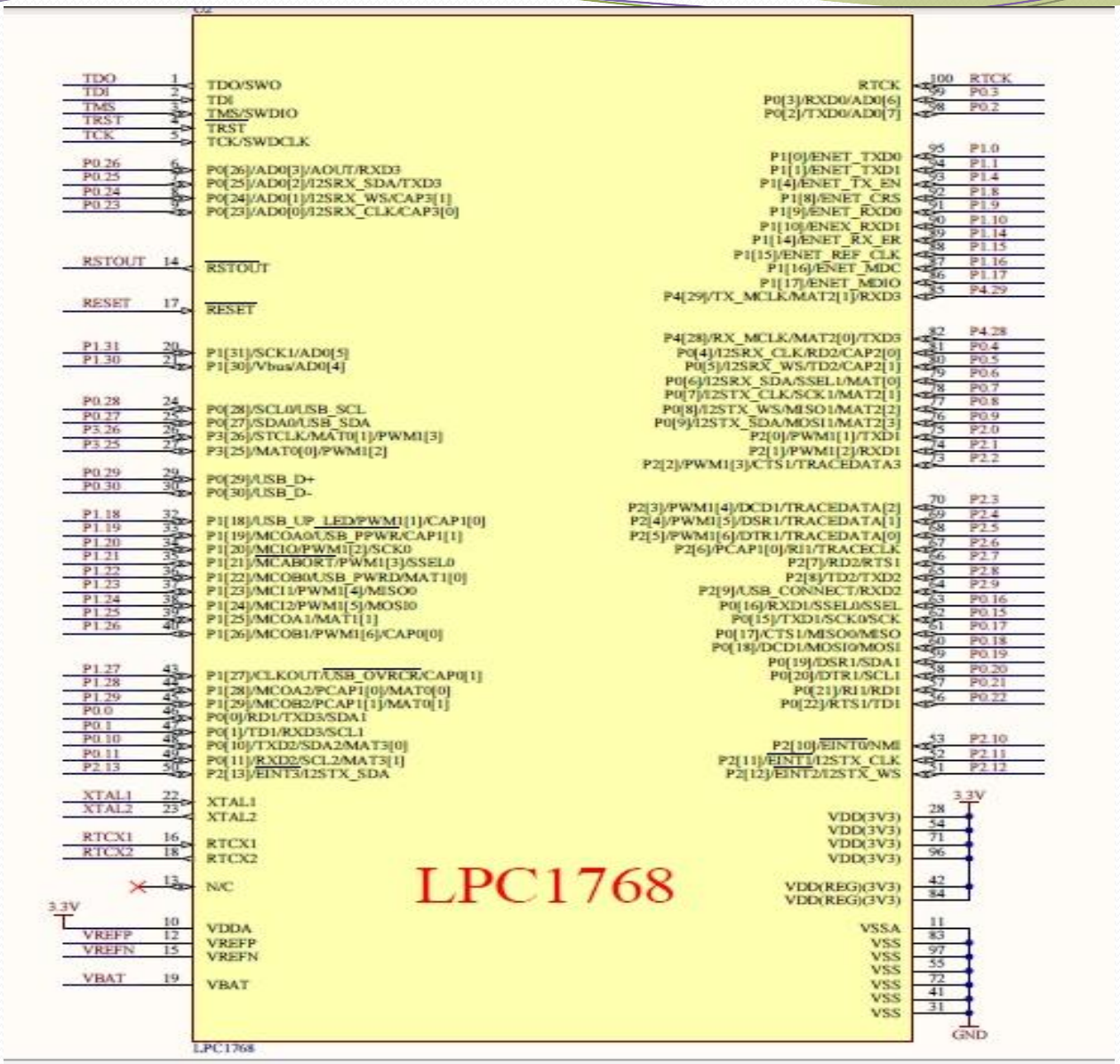
Conclusion

- System provides efficient way to cast vote free of fraud
- Resistive touch screen has disadvantage of resolution compared to capacitive touchscreen
- ARM cortex series is far more flexible, less power consuming and highly efficient microcontroller than other microcontrollers
- Application of theoretical engineering knowledge in practical scenario

References

- [1] Geisler, G. (1993). Fair? What's fairness got to do with it? Vagaries of election observations
- and democratic standards. *Journal of Modern African Studies*
- [2] Mebane, W. (2003).Detecting and Correcting Election Irregularities
- [3] Hite, R. C. (2004) Elections electronic voting offers opportunities and presents challenges
- [4] Thompson, K. (1984). Reflections on Trusting Trust *Communications of the ACM 27,* 1984
- [5] Cranor L, "Electronic Voting Hot List," http://lorrie.cranor.org/voting/hotlist.html, 2004.
- [6] Dill D, "E-voting Misconceptions," www.verifiedvoting.org/article.php?id=2609, 2004.

Thank You!


LPC1768
TDO/SWO
TDI
TMS/SWDIO
TRST
TCK/SWDCLK
P0[26]/AD0[3]/AOUT/RXD3
P0[25]/AD0[2]/I2SRX_SDA/TXD3
P0[24]/AD0[1]/I2SRX_WS/CAP3[1]
P0[23]/AD0[0]/I2SRX_CLK/CAP3[0]
RSTOUT
RESET
P1[31]/SCK1/AD0[5]
P1[30]/Vbus/AD0[4]
P0[28]/SCL0/USB_SCL
P0[27]/SDA0/USB_SDA
P3[26]/STCLK/MAT0[1]/PWM1[3]
P3[25]/MAT0[0]/PWM1[2]
P0[29]/USB_D+
P0[30]/USB_D-
P1[18]/USB_UP_LED/PWM1[1]/CAP1[0]
P1[19]/MCOA0/USB_PPWR/CAP1[1]
P1[20]/MCI0/PWM1[2]/SCK0
P1[21]/MCABORT/PWM1[3]/SSEL0
P1[22]/MCOB0/USB_PWRD/MAT1[0]
P1[23]/MCI1/PWM1[4]/MISO0
P1[24]/MCI2/PWM1[5]/MOSI0
P1[25]/MCOA1/MAT1[1]
P1[26]/MCOB1/PWM1[6]/CAP0[0]
P1[27]/CLKOUT/USB_OVRCR/CAP0[1]
P1[28]/MCOA2/PCAP1[0]/MAT0[0]
P1[29]/MCOB2/PCAP1[1]/MAT0[1]
P0[0]/RD1/TXD3/SDA1
P0[1]/TD1/RXD3/SCL1
P0[10]/TXD2/SDA2/MAT3[0]
P0[11]/RXD2/SCL2/MAT3[1]
P2[13]/EINT3/I2STX_SDA
XTAL1
XTAL2
RTCX1
RTCX2
N/C
VDDA
VREFP
VREFN
VBAT
RTCK
P0[3]/RXD0/AD0[6]
P0[2]/TXD0/AD0[7]
P1[0]/ENET_TXD0
P1[1]/ENET_TXD1
P1[4]/ENET_TX_EN
P1[8]/ENET_CRS
P1[9]/ENET_RXD0
P1[10]/ENEX_RXD1
P1[14]/ENET_RX_ER
P1[15]/ENET_REF_CLK
P1[16]/ENET_MDC
P1[17]/ENET_MDIO
P4[29]/TX_MCLK/MAT2[1]/RXD3
P4[28]/RX_MCLK/MAT2[0]/TXD3
P0[4]/I2SRX_CLK/RD2/CAP2[0]
P0[5]/I2SRX_WS/TD2/CAP2[1]
P0[6]/I2SRX_SDA/SSEL1/MAT[0]
P0[7]/I2STX_CLK/SCK1/MAT2[1]
P0[8]/I2STX_WS/MISO1/MAT2[2]
P0[9]/I2STX_SDA/MOSI1/MAT2[3]
P2[0]/PWM1[1]/TXD1
P2[1]/PWM1[2]/RXD1
P2[2]/PWM1[3]/CTS1/TRACEDATA3
P2[3]/PWM1[4]/DCD1/TRACEDATA[2]
P2[4]/PWM1[5]/DSR1/TRACEDATA[1]
P2[5]/PWM1[6]/DTR1/TRACEDATA[0]
P2[6]/PCAP1[0]/RI1/TRACECLK
P2[7]/RD2/RTS1
P2[8]/TD2/TXD2
P2[9]/USB_CONNECT/RXD2
P0[16]/RXD1/SSEL0/SSEL
P0[15]/TXD1/SCK0/SCK
P0[17]/CTS1/MISO0/MISO
P0[18]/DCD1/MOSI0/MOSI
P0[19]/DSR1/SDA1
P0[20]/DTR1/SCL1
P0[21]/RI1/RD1
P0[22]/RTS1/TD1
P2[10]/EINT0/NMI
P2[11]/EINT1/I2STX_CLK
P2[12]/EINT2/I2STX_WS
VDD(3V3)
VDD(REG)(3V3)
VSSA
VSS
3.3V
GND