Appendix B

Development Tools and Software programs

Appendix B: Development Tools and Software programs

This appendix gives list of Software development tools and Hardware development tools used for implementation of proposed techniques on FPGA and DSP.

Software Development Tools	Description
MATLAB 7.12.0.635 (R2011a)	It is an interactive environment for algorithm development, data visualization, data analysis, and rapid prototyping.
LTE-A Link Level Simulator LTE-A_v1.0_r100	It simulates test scenarios for analysis of LTE-A Downlink Physical Layer
Xilinx ISE Design Suite 14.6	It is a tool for HDL code design, synthesis and analysis for FPGA Development.
ModelSim PE Student Edition 10.2c	It is HDL Simulator to simulate, verify and debug the HDL Code developed
CCStudio v3.3 6713 DSK CCStudio	It comprises of compilers for TI TMS320C6713 and tools for development and debugging
SiLabs IDE v4.2	It consists of Keil C compiler to develop C code for Wireless Control of FTE Robot .
Eclipse IDE Release 3.7.0	It is used to develop C code for Wireless module.
Pololu Wixel Configuration Utility	To program Wireless module with Wireless Serial Application.

Table B. 1: Software Development Tools with Description

Hardware tools	Description
XUP Atlys Spartan-6 Developemnt Kit	For real-time implementation of throughput optimization techniques on Spartan-6 FPGA.
Spectrum Digital TMS320C6713 DSK	For real-time implementation of throughput optimization techniques on TMS320C6713 DSP.
SiLabs Microcontroller Development kit	It is used to develop and debug the C . code developed for FTE Robot
FTE Robot	Mobile Robot with various features
Pololu Wireless Wixel Modules	To implement Wireless Control of FTE Robot.

Table B. 2: Hardware Development Tools with Description

Table B.3 gives the Fuzzy Inference files developed for FL Decision model for MIMO mode switching in LTE-A Downlink Physical Layer.

FIS Files	Description
FIS_decision.fis	FL Decision model for MIMO mode Switching

Table B. 3: FIS Files

Table B.4 lists the MATLAB files developed for simulation of the proposed techniques.

MATLAB Files	Description
Softcomputing_for_MIMO_Systems	To open the main GUI for developed Soft-Computing Techniques
MIMO_WS	To open GUI MIMO Wireless Simulator and simulation of performance analysis
LTE_sim_test_allmodes	To compare throughput of MIMO configuration in LTE-A Downlink Physical layer
LTE_sim_test_ann_simulink	To simulate and test the performance of ANN based MIMO channel Estimation techniques developed .
LTE_sim_test_flmodel	To simulate and test the performance of FL Decision model for MIMO mode switching
LTE_channel_estimator_ann	To simulate and test the performance of MIMO Channel estimation based on ANN architectures
ANN_MIMO_Channel_Estimation	Simulation and Implementation FL Decision model for MIMO mode switching
FL_based_MIMO_switching	Simulation and Implementation of GRNN based MIMO Channel Estimation Technique

Table B. 4: MATLAB files with Description

Table B.5 lists the Simulink models developed for ANN based MIMO channel estimation and FL Decision model for MIMO mode switching.

Simulink Model Files	Description
fuzzy_switching_fixedpont_fil_new.mdl	For FIL simulation of FL Decision model
fuzzy_switching_fixedpont_pil.mdl	For PIL Simulation on DSP of FL Decision model
grnn_channelest_pil	PIL Simulation on DSP of GRNN based MIMO Channel estimation

Table B. 5: MATLAB Simulink model files

Figure B.6 lists the user friendly GUI developed for performance analysis of MIMO Wireless Systems.

GUI Files	GUI Description
Softcomputing_ for_ MIMO_ Systems.fig	Design and Implementation of Embedded Architecture Using Soft-Computing Techniques for Parametric Optimization of MIMO Wireless System
MIMO_ WS.fig	MIMO Wireless Simulator
Capacity_ analysis.fig	Capacity Analysis of MIMO Wireless Systems
sttc_ performance.fig	Performance analysis of STTC code design and BER
vblast_ receiver_ compare.fig	Performance analysis of VBLAST Receiver techniques
diversity_ compare_ figure.fig	Performance analysis of Diversity Techniques for MIMO Wireless
ANN_ MIMO_ Channel_ Estimation.fig	Throughput Analysis for ANN based MIMO Channel Estimation
FL_ based_ MIMO_ switching.fig	Throughput Analysis for FL based MIMO mode switching

Table B. 6: GUI Figure files