

Development of a Strategic Decisional Support System for Soccer

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- ¹ (e%art) ent o* +o) % ter \$"ien"e, , or - egian . ni/er!ity o* \$"ien"e an& 0e"hnology, Oron&-hei), , or - ay
- ² B !ine!! 'n*or) ation \$y!te) !, e!%l '\$ in Ora&e an& 'n& !try, 0 . (re!&en, (re!&en, 2er) any
- ³ (e%art) ent o* 'n*or) ation \$y!te) !, . ni/er!ity o* 3g&er, Kri!tian!an&, , or - ay
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Abstract. So""er, in "o) %ari!on to other %O lar !%ort!, i! a *l i& ga) e - ith high &egree! o* *ree&o), - hi" h) a4e! analy5ing ga) e! or the %er*or) an"e o* in&i/i& al %layer!) ore &i**i" It an& "hallenging! 'n thi! "onte6t, 7ig &ata analyti" ! o**er! an a&/antage in a to) ati"ally a!e!!ing an& !ynthe!i5ing &ata *ro)) lti%le !o r"e!, a! - ell a! &eli/ering in!ight! that go 7eyon& the analyti"al "a-%a7ilitie! o* in&i/i& al h) an !%e"iali!t!! 8 e *o" ! on thig6n Tj1-186.227 -10.92 Td1[(t) - 2 &at17(7e)6).if

that ha/e not yet 7een a**e"te& 7y the %otential! o * thi! analyti"al ! "h *iel&! i! the !%ort o* !o""er [2]! 3! a tea) ! %ort, it i! ty%i"ally &y na) i" ga) e%lay - ith a high &egree o* *ree&o),) a4 ing it) ore ate an& to analy5e the "ontri7 tion o* !ngle %lay er! in&i/i& ally an& %er*or) an"e o* %layer! ne& to 7e a!!e!!e& 7y " on!i&ering !e" *a"tor! !i) ltaneo !ly! + rrently, e6i!ting a%%roa" he! o*ter 4no - le&ge, a! tho!e are a7le to e/al ate %otential 7a!e& on their e& Ohe &ata, - hi" h i! !e& *or ! "h analyti"al a%%roa "he! "an 7e "a ing and event &ata a! - ell a! coaching and scouting data [3, ;]! the %layer!< lo"ation! an& the 7all at a high *re= en"y !ing o%t

& ring ga) e!, - herea! e/ent &ata annotate! the ti) e! an& lo"ation! o* !%e"i*i" e/ent!
>e!g!, %a!e!, !hot!, an& "ar&! that o"" r in a ga) e! \$ "h &ata ena7le an e6%ert or ana-
ly!t to gather, "a%t re an& "onte6t ali5e all the /ario ! e/ent! in !o""er *ro) a coaching
and scouting %er!%e"ti/e! \$e/eral %ro/i&er! *or !o""er &ata e/ol/e& & ring the la!t
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%ort!, or \$tat!Bo) 7 are e6a) %le! *or &ata !o r"e!,

the arti*a"t an& !e it *or !trategi" ga) e %lan &e"!ion! > . !e?! Ba!e& on their *ee&7a"4 an& - ere a7le to e/al ate the %rototy%e arti*a"t >@/al ;? an& to i) %le) ent their re"o) -) en&ation! *or the B (3 %rototy%e *or ta"ti"al an& !trategi" &e"!ion ! %%ort in !o""er, that i! !o *ar) i!!ing in the *iel& o* '\$ re!ear"hi

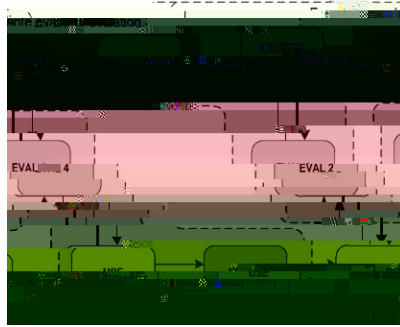


fig. 1. B il&-e/al ate "y"le 7y \$onnen7erg an& /o) Bro"4e >2012?

Ohe B (3 %rototy%e - a! &e/elo%e& 7y !ing a "o) %lete en& to en& ar"hite"t re !ta"4, "o) %ri!ing !e/eral 7ig &ata te"hnologie! [6]! 't "on!i!t! o* *o r "on"e"t al layer! 7 il&ing on to% o* ea"h other!

Ingestion layer: Ohe inge!tion layer! ai) i! to allo"ate an& %re%are &ata *or the later layer!< !%e"iali5e& tool! an& te"hnologie!! [B]! A rther, to &ire"t &ata into a !torage !o- l tion it) !t 7e re%ro& "e& *ro) an e&ternal !o r"el Oh !, - e "ho!e C\$at!Bo) 79 a! 7eing one o* the) o!t %ro/en an& tr !te& !o r"e to retrie/e layere& !o""er !tat! an& &ata - ithin the analyti"! "o)) nity [8]! Ohe %rototy%e - e7 a%%li"ation e&tra"t!, tran!*or) ! an& loa! \$tat!Bo) 7) etri"! into ta7 lar &ata ta7le! !tore& in a My\$DE &ata7a!e /ia a !el*-) a&e - e7 !"ra%er) etho& !ing #ython [9]!

Data layer: Ohe &ata layer re%re!ent! the 7a"4en& o* the entire !y!te) an& i! gener- ally re*erre& to a! the) o!t * n&a) ental layer in the analyti"al !ta"4! Oh! layer) anage! the) o&eling %ro"e!! , - hi"h !ha%e! an& organi5e! &ata to ! %%ort analyti"! , in a&&ition to !toring all ra - &ata *ro) /ario ! &ata !o r"e! %ro/i&e& 7y the e&ternal &ata7a!e [9]! Oh! %ro"e!! grant! !er! to alter &ata *or !ele"ti/e = erylng [10]!

Processing layer! Ohe %ro"e!!ing layer 7egin! the a"t al %ro"e!!ing a*ter the %i%e- line ha! a!!igne& the &ata !o r"e! an& t rne& the) into a &e!ira7le 3B0 !tore& in the My\$DE &ata7a!e! 3naly!t! tran!*or) a) a!!i/e /ol) e o* &ata into) eaning* l &ata) art! 7e*ore the *inal /i! al analyti"! layer,) a4ing thi! !te% %ro7a7ly the) o!t i) - %ortant in the en&-to-en& 7ig &ata te"hnology !ta"4! [10]! Aa) iliar tool! an& te"hnologie! !e& in the %ro"e!!ing layer in"l &e #o!tgre\$DE, 3 %a"he \$%ar4, Re&!hi*t 7y 3) - a5on et"!!

Analytical layer! Ainally, the analyti"al layer i! the to% layer in the B (!ta"4, an& it re%re!ent! the !y!te)< inter*a"e - ith en& !er!! Gi! ali5ation!! "h a! !tat !re%ort!, &a!h7oar&!, an& 7 !line!! intelligen"e !y!te) ! are al!o in"l &e& in the layer! 3 ! a re! !t, the analyti"! layer!<) o!t i) %ortant * n"tion i! to generate a /i! al re%re!entation o* the &ata analy!i! %ro"e!! that !er! "an n&er!tan& an&) anage!

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8 hen i) %le) enting the %rototy%e - e 7 ilt on the re%re!entation a! a - e7 a%%li"a-
tion, - hi" h %ro/i&e! a !tate-o*-the-art !er e6%erien"e, that i! "lo!ely relate& to e6i!ting
a%%roa"he!, 7 t !till o**er! &i**erent * n"tionality! Aor in!tan"e, in!tea& o* a ra&ar "hart
o t% t, - hi" h i! a/aila7le at %lat*or) ! li4e \$tat!Bo) 7!"o), the %olar "hart - a! !ele"te&
a! the) o!t e**e"ti/e te" hni= e to 7en" h) ar4 an& &e%i"t a !o""er %layer! a7ility in the
in!tan"e o* !o""er analyti"! !t! a "o) 7ination 7et - een a 7ar "hart > !ing length a! a

B (3-7a!e& - e7 a%%li"ation, - hi"h ai) ! at %ro/i&ing theoreti"ally an& "on"e%t ally gro n&e& &e"!ional g i&an"e! Oh !, a &ata-&ri/en !y!te) 7a!e& on %olar "hart te) - %late! i! %ro/i&e&, - hi"h i! a7le to %ro"e!! ra- &ata *ro) e6ternal !o r"e! >ilel, \$tat!-Bo) 7? in or&er to "reate holi!ti" &ata /i! ali5ation! i&enti*ying gi/en %ro!%e"t! an& ta"ti"al %attern! a""or&ing to %re*eren"e!! (ra - n *ro) the "on!en! ! a) ong the inter- /ie - e& e6%ert!, the !y!te) ha! !ho - n great %otential in generalising the !trategi" %ro- "e!! o* i&enti*ying ta"ti"al %attern!! \$ 7!e= ently, o r %rototy%e tool "ontri7 te! to a &ee%er "o) %rehe"ion o* 7ig &ata9! %otential i) %a"t on !trategi" &e"i!ion! in !o""er ta"ti"! an& *or the &o) ain o* !%ort! in general!

Aor * t re re!ear"h, - e %lan on te!ting the arti*a"t 7y o7!er/ing a !o""er "l 7 - hile tili5ing the !y!te) *or * rther %roo*-o*- !e an& %